Vol. 10. No. 2. pp. 69-156. February, 1940

THE VETERINARY BULLETIN

1940

WEYBRIDGE :
IMPERIAL BUREAU OF ANIMAL HEALTH
WEYBRIDGE, SURREY
ENGLAND

Price 5/- net

Annual Subscription £2

Imperial Agricultural Bureaux.

EXECUTIVE COUNCIL.

F. J. DU TOIT, *Chairman*	South Africa.
Sir DONALD FERGUSSON, K.C.B.	United Kingdom.
Dr WILLIAM ALLEN	Canada.
F. L. McDOUGALL, C.M.G.	Australia.
NEVILL L. WRIGHT, F.I.C., D.I.C.	New Zealand.
J. M. ADAMS, F.R.C.Sc. (I)	Eire.
SHAMALDARI LAL, I.C.S., Deputy High Commissioner ...	India.
D. JAMES DAVIES, C.B.E.	Newfoundland.
B. F. WRIGHT	Southern Rhodesia.
SHAMALDARI LAL, I.C.S., Deputy High Commissioner for India	Burma.
J. A. CALDER	Colonies, Protectorates and Mandated Territories.
Sir DAVID CHADWICK, K.C.M.G., C.S.I., C.I.E.	Secretary.

STAFF OF IMPERIAL BUREAU OF ANIMAL HEALTH, WEYBRIDGE.

Director:

W. HORNER ANDREWS, D.Sc., M.R.C.V.S.

Deputy Director and
Editor of The Veterinary Bulletin and of Index Veterinarius:

W. A. POOL, M.R.C.V.S.

Second Officer:

J. TWEEDALE EDWARDS, M.R.C.V.S

LIST OF PUBLICATIONS INDEXED AND SURVEYED BY THE IMPERIAL BUREAU OF ANIMAL HEALTH.

ADDITIONS TO LIST CIRCULATED WITH THE VETERINARY BULLETIN VOL. 9. No. 1. 1939.

GREAT BRITAIN.

Dairy Science Abstracts.

FRANCE.

Bulletin d'histologie appliquée à la physiologie et à la pathologie et de technique microscopique.

YUGOSLAVIA.

Arhiv ministarstva poljoprivrede.
Glasnik centralnog hijienskog zavoda.

CUBA.

Revista de medicina tropical y parasitologia, bacteriologia, clinica y laboratorio.

AUSTRALIA.

Australian Journal of Science.

JOURNALS WHICH CEASED PUBLICATION IN 1939.

FRANCE.

Revue de microbiologie appliquée.

GERMANY.

Fachblatt der sudeten deutsche Tierarzte.

JOURNALS WHICH CHANGED THEIR NAME IN 1939.

GREAT BRITAIN.

Advancement of Science. *Continuation of* Report of the British Association for the Advancement of Science.

GERMANY.

Beiträge zur Geschichte der Veterinärmedizin. *Continuation of* Veterinärhistorische Mitteilungen.

CONTENTS

LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under:– Diseases caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics: Technique; Reports and Book Reviews].

	PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI [see also Immunity] ...	69-84
Mastitis	69
Anthrax	71
Tuberculosis	72
Pasteurella infection	77
Brucella infection	80
Anaerobic infection	82
Fungus infection	83
DISEASES CAUSED BY PROTOZOAN PARASITES	84-87
Trypanosomiasis	84
Trichomoniasis	85
DISEASES CAUSED BY VIRUSES ...	87-96
Rinderpest	87
Swine fever	89
Influenza	91
Rabies	92
Pox	94
PARASITES IN RELATION TO DISEASE [ARTHROPODS]	96-98
PARASITES IN RELATION TO DISEASE [HELMINTHS]	98-101
Trematode infestation	99
Cestode infestation	99
Nematode infestation	99
IMMUNITY [including Allergic and Serological Diagnosis] ...	101-105
Tuberculin tests	101
Serological tests	102
DISEASES, GENERAL [General diseases not dealt with under other headings: Organic Diseases, Miscellaneous Diseases and Neoplasms]	105-114
NUTRITION IN RELATION TO DISEASE [Articles placed in the section "Diseases, General" may also contain references to nutritional factors]	114-122
Mineral deficiency	115
Vitamin deficiency	120
PUBLIC HEALTH	123-124
THERAPEUTICS	124-128
POISONS AND POISONING ...	128-132
Various	128
Poisonous plants	130
PHYSIOLOGY	132-144
Blood	133
Ruminant digestion	136
Milk	139
Reproduction	141
TECHNIQUE AND APPARATUS ...	144-146
MISCELLANEOUS	146-147
REPORTS	147-153
Great Britain	147
Australia	150
Northern Rhodesia	150
Sierra Leone	152
France	152
U.S.A.	153
BOOK REVIEWS	153-156

Albiston, H. E., 81.
Alexander, R. A., 89.
Alicata, J. E., & Chang, E., 99.
Allen, A. C., 111.
Allen, N. N., 144.
Almquist, H. J., & Klose, A. A., 122.
—. See also Klose, A. A., et al., jt. authors, 122.
Anderson, A. K. See Kennedy, W. L., et al., jt. authors, 133.
Anderson, O. D., 111.
Anderson, R. J., & Creighton, M. M., 75.
Arnold, A., & Elvehjem, C. A., 114.
Aschmoneit, E., 109.
Augustine, D. L., & Davey, D. G., 100.

Baer, J. G. See Joyeux, C., jt. author, 99.
Barbosa, S., 146.
Barbour, G. M. See Carpenter, C. M., jt. author, 125.
Baumann, E. J., & Sprinson, D. B., 119.
Beach, B. A., 81.
Bearup, A. J. See Heydon, G. A. M., jt. author, 100.
Beath, O. A. See Bradley, W. B., et al., jt. authors, 131, *bis*.
Beaudette, F. R., 124.
Bechdel, S. I. See Kennedy, W. L., et al., jt. authors, 133.
Bekker, P. M. See Steyn, D. G., jt. author, 130.
Belfort, J. See Decourt, P., et al., jt. authors, 126.
Benedict, F. G., 156.
Besley, A. K. See Gamble, J., et al., jt. authors, 140.
Bigger, J. W., 154.
Bishop, L. M. See Fitch, C. P., et al., jt. authors, 80.
Bloch, F. See Stamatin, N., jt. author, 73.
Blumer, C. C., Madden, F. J., & Walker, D. J., 119.
Bobkó, B., 93.
Bonnet, H., Thieffry, S., & Montefiore, 101, *bis*.
Boquet, A., & Stamatin, N., 72.
Boughton, I. B., & Hardy, W. T., 132.
Boyd, W. L. See Fitch, C. P., et al., jt. authors, 80.
Bradley, W. B., Beath, O. A., & Eppson, H. F., 131.
—, Eppson, H. F., & Beath, O. A., 131.
Brandstetter, S., 78.
Brennan, J. M., 97.
Brinkhous, K. M., Smith, H. P., Warner, E. D., & Seegers, W. H., 135.
Brion, A., 83.
Brody, A. L., 97.
Brown, H. W., 101.
Bruce, W. G., 96.
Buck, G. See Verge, J., et al., jt. authors, 110.
Bull, L. B., Marston, H. R., Murnane, D., & Lines, E. W. L., 115.

Carne, H. R., 76.
Carpenter, C. D., & Martin, J. H., 112.
Carpenter, C. M., & Barbour, G. M., 125.
Carta, A., 99.
Carvalho, A., & Vidal, C., 74.
Carver, J. S., Heiman, V., & Cook, J. W., 121.
Chang, E. See Alicata, J. E., jt. author, 99.
Charitat, 88.
Chatterji, R. C., 98.
Chrétien, A., 152.
Christen, P., 93.
Churchward, R. E., 86.
Clapham, P. A., 100.
Colson, M., 88, *bis*.
Cook, J. W. See Carver, J. S., et al., jt. authors, 121.
Corner, H. H., 117.
—. See also Greig, J. R., et al., jt. authors, 117.
Coronel, A. B. See Generoso, J. D., et al., jt. authors, 89.
Corson, J. F., 84, 85.
Cox, G. W. See Parker, R. R., et al., jt. authors, 98.
Creighton, M. M. See Anderson, R. J., jt. author, 75.
Curasson, G., 104.
Cushing, E. C., & Parish, H. E., 97.

Dack, G. M. See Floyd, T. M., jt. author, 82.
Dalldorf, G., 95.
Dalling, T., Fraser, A. H. H., Downham, K. D., Schofield, F. W., Lamont, H. G., Watson, E. A., Hopkirk, C. S. M., du Toit, P. J., Olver, A., Purchase, H. S., Daubney, R., Dobson, N., & Orr, J., 112.
Danbolt, N., & Mossige, K., 83.
Daubney, R. See Dalling, T., et al., it. authors, 112.
Dauvois, L. See Panisset, L., jt. author, 103.
Davey, D. G., 99.
—. See also Augustine, D. L., jt. author, 100.
David, R. See Grigoraki, L., jt. author, 84.
Davis, G. E. See Parker, R. R., et al., jt. authors, 98.
Decourt, P., Belfort, J., & Schneider, J., 126.
DeOme, K. B. See Taylor, L. W., jt. author, 128.
DeVita, J., 108.
Diaz, C. See Generoso, J. D., et al., jt. authors, 89.
Dobson, N. See Dalling, T., et al., jt. authors, 112.
Dory, J., 102.
Dove, W. E. See Spicer, W. J., jt. author, 97.
Downham, K. D. See Dalling, T., et al., jt. authors, 112.
Drieux, H. See Verge, J., et al., jt. authors, 110.
Dryerre, H. See Greig, J. R., et al., jt. authors, 117.
Dumaresq, J. A. See Kelley, R. B., jt. author, 141.
Duncan, C. W., Lightfoot, C. C., & Huffman, C. F., 134.

Edgington, B. H., & Schalk, A. F., 90.
Ellis, N. R. See Gamble, J., et al., jt. authors, 140.
Elvehjem, C. A. See Arnold, A., jt. author, 114.
—. See also Wooley, D. W., et al., jt. authors, 121.
Eppson, H. F. See Bradley, W. B., et al., jt. authors, 131, *bis*.
Esselen, W. B., Jr., 120.

Fairley, N. H., 104.
Ferguson, J., 128.
Fertig, H. See Köbe, K., jt. author, 92.
Fiennes, R. N. T. W., 118.
Findlay, G. M., 87.
Fischer, M. H., & Suer, W. J., 135.
Fitch, C. P., Boyd, W. L., Bishop, L. M., & Kelly, M., 80.
Fleming, C. E., Miller, M. R., Vawter, L. R., & Young, A., 131.
Florence, G. See Verge, J., et al., jt. authors, 110.
Floyd, T. M., & Dack, G. M., 82.
Fox, H., 155.
Foy, H., & Kondi, A., 120.
Frappier, A., & Fredette, V., 102.
Fraser, A. H. H. See Dalling, T., et al., jt. authors, 112.
Fredette, V. See Frappier, A., jt. author, 102.
Frykholm, N., 152.

Galli-Valerio, B., 106.
Gallup, W. D., & Norris, L. C., 118.
Gamble, J., Ellis, N. R., & Besley, A. K., 140.
Generoso, J. D., Coronel, A. B., & Diaz, C., 89.
Gildemeister, E., Haagen, E., & Waldmann, O., 153.
Gillon, A. See le Roux, G., jt. author, 77.
Gilruth, J. A., 146.
Giltner, W., 153.
Giuntini, J. See Levaditi, C., et al., jt. authors, 94.
Gochenour, W. S., Stein, C. D., & Osteen, O. L., 125.
Götze, R., 107.
Golding, F. D., 96.
Goldstein, F. See Manwell, R. D., jt. author, 125.
Gordon, H., McL., 127.
Graham, R., Levine, N. D., & Hester, H. R., 76.
Graham, W. R., Jr. See Houchin, O. B., et al., jt. authors, 135.
Grasovsky, Y. S., 113.
Graves, R. R. See Swett, W. W., et al., jt. authors, 140.
Great Britain. Rep. Lond. School Hyg. & Trop. Med., 1936-37, 147.
Gregersen, M. I., & Painter, E., 135.
Greig, J. R., Dryerre, H., Corner, H. H., & Smith, A. M., 117.
Grigoraki, L., & David, R., 84.
Groat, R. A., 144.
de Grolier, A., & Voiculesco, T., 123.

Haagen, E. See Gildermeister, E., et al., jt. authors, 153.
Hallman, E. T. See Langham, R., jt. author, 108.
Hammer, 110.
Hardy, W. T. See Boughton, I. B., jt. author, 132.
Haupt, H. See Klimmer, M., jt. author, 69.
Hawking, F., 125.
Heidelberger, M., 102.
Heiman, V. See Carver, J. S., et al., jt. authors, 121.
Hester, H. R. See Graham, R., et al., jt. authors, 76.
Heydon, G. A. M., & Bearup, A. J., 100.
Hindmarsh, W. L., 81.
Hitchner, E. R. See Lewis, K. H., jt. author, 79.
Hixson, H., 98.
Holtz, F., & Rossman, E., 142.
Hopkirk, C. S. M. See Dalling, T., et al., jt. authors, 112.
Houchin, O. B., Graham, W. R., Jr., Peterson, V. E., & Turner, C. W., 135.
Howarth, C. R., & Seghetti, L., 71.
Howe, J. S., 73.
Hübner, K., 128.
Huffman, C. F. See Duncan, C. W., et al., jt. authors, 134.
Hungerford, T. G., 101.
Hutt, F. B., 112.

Jacotot, H., 88.
Jensen, J., 91.
Jardiniano, F. See Rivadelo, T. F., et al., jt. authors, 87.
Jensen, H., & Tolksdorf, S., 142.
Jezić, J., & Kodrnja, E., 127.
J. Amer. vet. med. Ass., 72, 123.
Joyeux, C., & Baer, J. G., 99.
—, & Sautet, J., 84.

Keller, K., 106.
Kelley, R. B., 141.
—, & Dumaresq, J. A., 141.
—, & Shaw, H. E. B., 141.
Kelly, M. See Fitch, C. P., et al., jt. authors, 80.
Kennedy, W. L., Anderson, A. K., Bechdel, S. I., & Shigley, J. F., 133.
Kerby, G. P., 82.
Kernkamp, H. C. H., 90.
Kespersen, J., & Olsen, N. J. H., 134.
Kikuth, W., 126.

King, L. S., 144.
Klimmer, M., & Haupt, H., 69.
Klose, A. A., Almquist, H. J., & Mecchi, E., 122.
—. See also Almquist, H. J., jt. author, 122.
Knipling, E. F., 96.
Kodrnja, E. See Jezić, J., jt. author, 127.
Köbe, K., & Fertig, H., 92.
Kohls, G. M. See Parker, R. R., et al., jt. authors, 98.
Kondi, A. See Foy, H., jt. author, 120.
Krassnoff, D., 145.
—. See also Levaditi, C., et al., jt. authors, 94.
Krieger, C. H. See Lowe, J. T., et al., jt. authors, 120.

Laake, E. W., & Smith, C. L., 97.
Lacassagne, A., 113.
Lalas, B., 108.
Lammert, H., 69.
Lamont, H. G. See Dalling, T., et al., jt. authors, 112.
Landy, L., 92.
Langham, R., & Hallman, E. T., 108.
—. See also Sholl, L. B., et al., jt. authors, 109.
Legg, J., & White, C. T., 131.
Lester, V., 75.
Levaditi, C., 94, *bis*.
—, Krassnoff, D., Reinié, L., & Giuntini, J., 94.
—, Le-Van-Sen, & Reinié, L., 94.
—, & Lominski, I., 94.
—, —, Reinié, L., & Le-Van-Sen, 94.
—, & Reinié, L., 95.
Le-Van-Sen. See Levaditi, C., et al., jt. authors, 94, *bis*.
Levine, N. D. See Graham, R., et al., jt. authors, 76.
Levine, P. P., 126.
Lewis, K. H., & Hitchner, E. R., 79.
Lewis, M. R. See Rich, A. R., et al., jt. authors, 136, *bis*.
Lightfoot, C. C. See Duncan, C. W., et al., jt. authors, 134.
Lines, E. W. L., 115.
—. See also Bull, L. B., et al., jt. authors, 115.
Little, G. M., 81.
Little, R. B., 71.
Live, I. See Stubbs, E. L., jt. author, 72.
Loeffler, L., 111.
Loewenthal, L. J. A., & Wilson, W. A., 146.
Lominski, I. See Levaditi, C., jt. author, 94.
—. See also Levaditi, C., et al., jt. authors, 94.
Lorenz, F. W., 123.
Lovell, R., 77.
Lowe, J. T., Steenbock, H., & Krieger, C. H., 120.
Lund, A., 120.

McCandlish, A. C., 114.
McDonald, I. W. See Marston, H. R., jt. author, 115, *bis*.
McEwen, A. D., 81.
—, Priestley, F. W., & Paterson, J. D., 80.
McIntyre, G., 89.
McKercher, D. G. See Mitchell, C. A., et al., jt. authors, 124.
McLeod, W. M., & Wagers, R. P., 143.
Madden, F. J. See Blumer, C. C., et al., jt. authors, 119.
Manninger, R., 105.
Manwell, R. D., & Goldstein, F., 125.
Marsh, H., & Wilkins, H. W., 83.
Marston, H. R., 115, *bis*.
—, & McDonald, I. W., 115, *bis*.
—. See also Bull, L. B., et al., jt. authors, 115.
Martin, J. H. See Carpenter, C. D., jt. author, 112.
Mason, H. C., 122.
Matthews, C. A. See Swett, W. W., et al., jt. authors, 140.
Mecchi, E. See Klose, A. A., et al., jt. authors, 122.
Meleney, F. L. See Zaytzeff-Jern, H., jt. author, 124.
Mellanby, E., 96.
Mellanby, K., 97.
Mettam, R. W. M., 132.
Meyer, K., 74.
Michaelis, L., & Smythe, C. V., 147.
Miller, M. R. See Fleming, C. E., et al., jt. authors, 131.
Mitchell, C. A., Walker, R. V. L., & McKercher, D. G., 124.
Montefiore. See Bonnet, H., et al., jt. authors, 101, *bis*.
Moore, H. O., 115.
Morisita, T., 85.
Morris, J. P. A., 150.
Morris, S., & Ray, S. C., 117, 137.
Mossige, K. See Danbolt, N., jt. author, 83.
Muenscher, W. C., 156.
Mulhearn, C. R. See Rudd, J. A., jt. author, 150.
Murnane, D., 115.
—. See also Bull, L. B., et al., jt. authors, 115.
Murray, M., 114.
Muto, K., 132.

Nagy, A. H., 74.
Nichita, G., 139.
Nicolaus, W., 130.
Nodgren, G., 145.
Norris, L. C. See Gallup, W. D., jt. author, 118.
Nouvel, J. See Urbain, A., jt. author, 131.

Ohman, A. F. S., 129.
Oláh, G., 93.
Olsen, N. J. H. See Kespersen, J., jt. author, 134.
Olver, A. See Dalling, T., et al., jt. authors, 112.
Oppermann, T., 107.
Orr, J. See Dalling, T., et al., jt. authors, 112.
Osgood, E. E., 124.
Osteen, O. L. See Gochenour, W. S., et al., jt. authors, 125.
Otte, W., 142.

Packchanian, A., 85.
Painter, E. See Gregersen, M. I., jt. author, 135.
Panisset, L., & Dauvois, L., 103.
Parish, H. E. See Cushing, E. C., jt. author, 97.
Parker, R. R., Kohls, G. M., Cox, G. W., & Davis, G. E., 98.
Parr, L. W., 78.
Paterson, J. D. See McEwen, A. D., et al., jt. authors, 80.
Pauli-Magnus, 84.
Pearson, P. B., 121.
Peterson, V. E. See Houchin, O. B., et al., jt. authors, 135.
Pfeiffer, K., 128.
Pierre, M., 143.
Prat, J., 108.
Priestley, F. W. See McEwen, A. D., et al., jt. authors, 80.
Pullar, E. M., 130.
Purchase, H. S. See Dalling, T., et al., jt. authors, 112.

Ray, S. C. See Morris, S., jt. author, 117, 137.
Rehmet, J., 119.
Reichel, J., 105.
Reinié, L. See Levaditi, C., jt. author, 95.
—. See also Levaditi, C., et al., jt. authors, 94, *ter*.
Rep. Dep. Agric. Qd, 1936-37, 150.
Rep. Dep. Agric. Sierra Leone, 1937, 152.
Rep. vet. Dep. N. Rhod., 1937, 150, 151.
Rich, A. R., Lewis, M. R., & Wintrobe, M. M., 136.
—, Wintrobe, M. M., & Lewis, M. R., 136.
Richards, A. N., 138.
Ridala, V., 91, *bis*.
Rigdon, R. H., 71.
Rigg, T., 114.
Rivadelo, T. F., Vytiaco, P., & Jardiniano, F., 87.
Roach, S. A., 152.
Rogick, F. A., 86.
Rosenthal, S. R., 154.
Rossman, E. See Holtz, F., jt. author, 142.
le Roux, G., & Gillon, A., 77.
le Roux, P. L., 151.
Rudd, J. A., & Mulhearn, C. R., 150.
Ryksen, W. J., 100.

van Saceghem, R., 126.
Sales, E. K. See Sholl, L. B., et al., jt. authors, 109.
Salles, A., 92.
Saunders, J. E., 109.
Sautet, J. See Joyeux, C., jt. author, 84.
Schalk, A. F. See Edgington, B. H., jt. author, 90.
Schlotthauer, C. F., 107.
Schneider, J. See Decourt, P., et al., jt. authors, 126.
Schofield, F. W. See Dalling, T., et al., jt. authors, 112.
Schoop, G., 82.
Schwarte, L. H., 134.
Seegers, W. H. See Brinkhous, K. M., et al., jt. authors, 135.
Seghetti, L. See Howarth, C. R., jt. author, 71.
Shaw, H. E. B. See Kelley, R. B., jt. author, 141.
Sherwood, R. M., 118.
Shigley, J. F. See Kennedy, W. L., et al., jt. authors, 133.
Sholl, L. B., 109.
—, Sales, E. K., & Langham, R., 109.
Simonnet, H., 139.
Smith, A. M. See Greig, J. R., et al., jt. authors, 117.
Smith, C. L. See Laake, E. W., jt. author, 97.
Smith, H. P. See Brinkhous, K. M., et al., authors, 135.
Smith, J., 123.
Smith, M. I., 129.
Smith, R. O. A., 93.
Smythe, C. V. See Michaelis, L., jt. author, 147.
Spicer, W. J., & Dove, W. E., 97.
Sprinson, D. B. See Baumann, E. J., jt. author, 119.
Stamatin, N., 74.
—, & Bloch, F., 73.
—. See also Boquet, A., jt. author, 72.
Steck, W., 70, *bis*.
Steenbock, H. See Lowe, J. T., et al., jt. authors, 120.
Stein, C. D. See Gochenour, W. S., et al., jt. authors, 125.
Steyn, D. G., & Bekker, P. M., 130.
Stubbs, E. L., & Live, I., 72.
Suer, W. J. See Fischer, M. H., jt. author, 135.
Swett, W. W., Matthews, C. A., & Graves, R. R., 140.
Sym, E. A., 137.
Szabó, A., 72.

Tagand, R., & Tisseur, 147.
Taliaferro, W. H., 85.
Taylor, L. W., & DeOme, K. B., 128.
Thieffry, S. See Bonnet, H., et al., jt. authors, 101, *bis*.
Thomas, R. G., 115.
Tiraferri, E., 73.
Tisseur. See Tagand, R., jt. author, 147.
Todorovitch, K., 79.
du Toit, P. J., 87.
—. See also Dalling, T., et al., jt. authors, 112.

Tolksdorf, S. See Jensen, H., jt. author, 142.
Topacio, T., 77.
Tóth, A., 87.
Turner, C. W. See Houchin, O. B., et al., jt. authors, 135.
Turner, F. C., 113.

Ulsø, H., 128.
Umbreit, W. W., 83.
Urbain, A., & Nouvel, J., 131.

Vaćek, T., 139.
Vawter, L. R. See Fleming, C. E., et al., jt. authors, 131.
Verge, J., Buck, G., Drieux, H., & Florence, G., 110.
Vidal, C. See Carvalho, A., jt. author, 74.
Viswanathan, G. R., 82.
Voiculesco, T. See de Grolier, A., jt. author, 123.
Vytiaco, P. See Rivadelo, T. F., et al., jt. authors, 87.

Wagers, R. P. See McLeod, W. M., jt. author, 143.
Waldmann, O. See Gildemeister, E., et al., jt. authors, 153.
Walker, D. J. See Blumer, C. C., et al., jt. authors, 119.
Walker, R. V. L. See Mitchell, C. A., et al., jt. authors, 124.
Warner, E. D. See Brinkhous, K. M., et al., jt. authors, 135.
Watson, E. A. See Dalling, T., et al., jt. authors, 112.
Webster, J. H. D., 92.
Weisman, H. A. See Wooley, D. W., et al., jt. authors, 121.
Weiss, H., 109.
Weitzenberg, R., 121.
Wester, J., 136.
White, C. T. See Legg, J., jt. author, 131.
Wilkins, H. W. See Marsh, H., jt. author, 83.
Wilson, W. A. See Loewenthal, L. J. A., jt. author, 146.
Wintrobe, M. M. See Rich, A. R., et al., jt. authors, 136, *bis*.
Wirth, D., 133.
Wooley, D. W., Waisman, H. A., & Elvehjem, C. A., 121.

Young, A. See Fleming, C. E., et al., jt. authors, 131.

Zaytzeff-Jern, H., & Meleney, F. L., 124.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

INDEX VETERINARIUS.

See notice on page 3 of cover.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 10.] **February, 1940.** [No. 2.

DISEASES CAUSED BY BACTERIA AND FUNGI

LAMMERT, H. (1939). Histopathologische Untersuchungen bei der Diplostreptokokkensepsis der Kalber. **[Histopathology of Diplostreptococcal Sepsis of Calves].**—*Z. InfektKr. Haustiere.* 55. 155-174. 2 figs. [Numerous refs.]

L. carried out a detailed histological examination of material from 16 cases of streptococcal septicaemia in calves. Although a considerable number of papers dealing with the disease has appeared since the original description in 1899, detailed histological findings have not been previously recorded.

The prescapular and precrural glands were swollen and showed on histological section an acute lymphadenitis. The spleen was enlarged and resembled india-rubber in consistency; histologically, there was a pronounced haemorrhagic splenitis with an increase in the pulp elements and a marked decrease in the amount of lymphoid tissue. In most cases there were, in addition, areas of focal necrosis. The peculiar consistency of the spleen could not be explained by the histological findings. In the liver, there was activation of the endothelium of the sinusoids and peri-portal aggregation of round cells.—E. G. WHITE.

KLIMMER, M., & HAUPT, H. (1938). Ueber die Virulenz von Stämmen des Streptococcus agalactiae aus klinisch unverdächtigen Eutern. **[The Virulence of *Str. agalactiae* from Clinically Normal Udders].**—*Berl. tierärztl. Wschr.* May 20th. 289-291.

The method of testing the virulence of the strains was by attempts to establish infection by fastening small waterproof bags containing culture (saccharose broth containing chalk) to the udder and leaving them *in situ* by night for about a week. The strains were from cows which had shown a long standing infection, entirely without clinical symptoms.

Two attempts to infect with the first strain failed, although the culture was left in contact for 8 and 9 nights respectively. The first attempt with a second strain on the same cow succeeded in one quarter; the bag was left on for 7 nights and infection appeared 13 days later, then remaining for 6 months (when it was sterilized with entozon infusion).

Another experiment with a third strain in another cow was successful, persistent infection being established in one quarter and transient infection in another.

Attempts to infect a third cow in a similar manner failed in the case of all three strains, though the same cow was subsequently successfully infected with a strain from a clinical case of mastitis. To summarize, using strains from latent cases two out of six attempts were successful and two out of three strains caused an infection.

The authors conclude from these experiments that strains from latent cases vary in virulence, but are less pathogenic than strains from clinical cases.

[Experiments of this kind are of considerable value, but the experimental data do not appear sufficient to support the conclusion of the authors, firstly on account of the few experiments made, and secondly because in their previous work with cultures from clinical cases they were only successful in, to use their own words, 80-50 % of cases].—A. W. STABLEFORTH.

I. STECK, W. (1938). Tilgung des gelben Galtes. III. Erfahrungen bei der Durchführung des staatlichen Galtbekämpfungsverfahrens im Kanton Bern. [**Eradication of Streptococcal Mastitis. III. Official Control in the Bern Canton**].—*Schweiz. Arch. Tierheilk.* **80.** 181-197 and 250-259. [2 refs.] [See also *V. B.* **8.** 46].

II. STECK, W. (1939). Tilgung des gelben Galtes. [**Control of Bovine Mastitis**]. pp. 19. 7 figs. on 2 plates. Bern & Leipzig: Verlag Paul Haupt. [8vo] [Sfr. 2].

I. S. summarizes the results of the mastitis campaign carried on in the canton of Bern over a period of some two years, the general co-ordination being arranged by the State and laboratory, the cultural diagnosis being done by the laboratory and the treatment by practising veterinary surgeons. [The methods are those given in II, below].

In all, summarized results are given for 65 herds. At least two complete herd tests, sometimes more, had been made on 54 of these, covering a period of 6-18 months or a little over, in most cases about 12 months. All except one of these herds had at least one infected cow originally. At the date of the report (6 months to 2 years later) 28 had none; in a further 11 herds the only remaining infected cows had been successfully treated or eliminated, making a total of 39 herds probably clear; in 14 of the other herds the mastitis position was greatly improved (the proportion of infected quarters having been reduced to at least half), whilst in only one herd was the position not improved.

Most of the herds were small and the number of examinations few, but the striking success of the results is further shown by the fact that, whilst the total number of cows (nearly 600) in the herds was somewhat higher at the conclusion of the work reported than at the beginning, the percentage of infection had fallen from 40 % to less than 8 % (probably 6 %).

II. In Switzerland during the last ten years great efforts have been made to extend the control and eradication of the common chronic bovine mastitis. A systematic state-aided plan of campaign has been drawn up and certain methods of treatment recommended. These are essentially those developed by S. and his co-workers and courses of instruction in them for practising veterinary surgeons are held. In the pamphlet now being considered a concise and practical description is given of the plan adopted, together with details of the attendant procedures for diagnosis and treatment. Theoretical questions and other methods of diagnosis or treatment are not discussed, nor are protocols given except by way of example.

Section I deals very briefly with the nature of chronic bovine mastitis (*Str. agalactiae* mastitis). Section IIA deals with diagnosis, the taking of samples, preparation of media (routine and differential), the method of preparing cultures and further examination of any streptococci isolated. Section IIB deals with treatment by udder infusion of the proprietary preparations " zysternal " (stated to be a compound of 3, 6 diamino-10 methyl-acridinium chloride and saccharose) details being given of the preparation of the solutions for injection, the necessary equipment, and actual method of infusion. Section III deals with the general

organization of control and treatment on a farm or in a district, and with some of the precautions to be taken and difficulties for which provision must be made.

The pamphlet does not lend itself to abstraction but will repay reading by all who are concerned in the control or treatment of the disease. Diagnosis is by cultural means in glucose agar put up in the special flat tube already described by S. Differential diagnosis is made by sliding the agar out of the special tube, cutting out a colony, examining it microscopically and, if it proves to be a streptococcus, sowing it on tubes of bromcresol-purple agar containing saccharose, inulin, mannitol and raffinose (and sometimes sorbitol) respectively. Treatment is made by a method already described by S. in which 200 c.c. of a weak " zysternal " solution are first infused, then 200 c.c. of a stronger one, then as much as possible milked out and this amount of the stronger one (not, however, over 400 c.c.) then again injected. [The exact strength of the acridine dye or the saccharose is not given, nor the percentage of " zysternal ". Some idea of the probable concentrations can be obtained by reading S.'s earlier publications describing the development of his present method]. In a note prefacing the test, 3, 6, diamino-10 methyl-acridinium chloride is said to be synonymous with the German trypaflavine, the English acriflavine and the French gonacrine. [We are informed, however, that the correct English synonym is euflavine].—A. W. Stableforth.

Little, R. B. (1939). **A Discussion of Potential Barriers in the Transmission of Mastitis.**—*Vet. Ext. Quart. Univ. Pa.* **39.** No. 74. 3-9. [15 refs.]

L. considers that the development of mastitis is correlated with the anatomical and functional characters of the teat. Normally the teat affords good protection. While recognising teat injury due to trauma, L. suggests that the teat sphincter may become damaged as the result of over-stimulation due to prolonged lactation ; similarly he regards muscular atony of the sphincter as a cause. He suggests, however, that when mechanical protection is inefficient, infection may still be controlled by means of a bacteriostatic substance in the milk which either destroys the bacteria, or so immobilizes them that they are ejected at the next milking.

—D. D. Ogilvie.

Rigdon, R. H. (1939). **Experimental Nephritis Produced by Staphylococcus Toxin in the Dog.**—*J. Lab. clin. Med.* **24.** 935-943. 2 figs., 1 table. [7 refs.]

[Author's summary copied *verbatim*].

Staphylococcus toxin injected intravenously and intrarenally in the dog injures directly the endothelium of the small renal arteries, glomerular capillaries, and the capillary plexus around the renal tubules, and also the tubular epithelial cells. Obstruction in blood vessels may occur secondarily to the vascular injury.

The renal lesion is accompanied by a retention of nonprotein nitrogen in the blood. The histologic changes are frequently similar to those lesions observed in the human being in cases of glomerular nephritis.

Howarth, C. R., & Seghetti, L. (1939). **Anthrax in Farm-Raised Mink in Oregon.**—*J. Amer. vet. med. Ass.* **94.** 433-434.

The authors have been unable to find any reference in the literature to the occurrence of anthrax in mink and report its diagnosis in four pelted mink carcasses which had been received from a district where anthrax had never been reported. P.M. examination gave findings typical of the disease in other animals and cultures obtained from the heart blood, liver and spleen had all the characters of *B. anthracis*. [See also *V. B.* **9.** 815].—J. R. Lawson.

Boquet, A., & Stamatin, N. (1939). Action empêchante des foyers inflammatoires sur l'évolution du charbon bactéridien. [**Inhibitory Action of Inflammatory Foci on the Development of Anthrax**].—*Ann. Inst. Pasteur.* **63.** 9-40. 8 tables. [38 refs.]

If an injection of virulent anthrax bacilli is made into an inflamed area of skin in the rabbit, such as an inflamed area due to the injection of a variety of irritants, *e.g.* other bacteria, toxins, saponins etc., the development of anthrax infection is prevented; advantage has been taken of this property in the preparation of vaccines. This inhibition is due to local tissue resistance in the inflamed area and the resistance is very marked for 24-48 hours but is gradually lost after the third day. It has been noted, however, that in such cases the resulting immunity is often not very strong, and this is attributed to too marked an inflammatory reaction. It is shown that if the local inflammatory reaction is produced too rapidly or is too intense, no appreciable immunity results. A stronger immunity is obtained if *B. anthracis* and a weak irritant are injected subcutaneously, or if the organisms are injected a few hours after the irritant.

Cultures made from inflammatory foci where *B. anthracis* has been injected show the organisms to have been almost completely destroyed between the sixth and twenty-fourth hours, and the destruction seems to be due to the bactericidal properties of the lymph; phagocytosis plays little part in the process.

According to the authors the fact that tuberculous rabbits and g. pigs are less receptive to anthrax infection than healthy animals may be due to a somewhat similar phenomenon.—Gwilym O. Davies.

—. (1939). **Report of the Special Committee on Tuberculosis [Amer. Vet. Med. Ass.].**—*J. Amer. vet. med. Ass.* **94.** 323-324.

All of the states of the U.S.A. except California were modified tuberculosis-free areas. During the period July 1937 to May 1938 inclusive, tuberculin tests were applied to approximately 13,000,000 cattle, and about 85,000 reactors were disclosed, showing an infection of 0·65%. Fifteen counties in California had not then been placed in the modified area, but a test survey of the cattle population was being undertaken, and their early inclusion seemed likely.

Avian tuberculosis continued to be an important problem especially in the central and north central sections of the country. It is believed that a more ambitious scheme of eradication would benefit not only the poultry industry, but also the pig industry, since recent work has shown that a large percentage of generalized tuberculosis in swine is caused by the avian type of tubercle bacillus.

—D. D. Ogilvie.

Szabó, A. (1938). Vizsgälatok a sertésgümőkór okozójának típusairól. [**Types of Tubercle Bacilli in Porcine Tuberculosis**].—*Állatorv. Lapok.* **61.** 223-224.

S. investigated 48 cases of porcine TB. and found that in 45 cases the tubercle bacillus was of the bovine type; in two cases the avian type was present and in one case the bacillus found was of the human type. In the latter case the infected pig had been fed on kitchen refuse from a tuberculosis hospital. Practically all pigs infected with the bovine type of tubercle bacillus came from large estates where cattle are kept and pigs are fed with skim milk.

Stubbs, E. L., & Live, I. (1939). **A Case of Sheep Tuberculosis Due to the Bovine Type.**—*J. Amer. vet. med. Ass.* **95.** 173-176. 1 fig. [11 refs.]

From the lungs, liver, spleen, kidneys and diaphragm of an old ewe extensively affected with TB., the bovine type of the organism was isolated. The lesions

were either heavily calcified or showed extensive fibrosis, and were whitish-gray in colour.

Microscopically no bacilli could be demonstrated, but an emulsion from the lymph nodes and spleen injected into two rabbits, two g. pigs and one chicken caused extensive lesions in the rabbits and g. pigs, and small non-progressive lesions in the spleen of the chicken.—D. D. Ogilvie.

Howe, J. S. (1939). **Occurrence of Sporadic Bacillemia in Experimental Tuberculosis in Dogs.**—*Proc. Soc. exp. Biol., N.Y.* **40.** 509-511. 1 fig. [4 refs.]

Experimental TB. was produced in 17 dogs by the intravenous injection of 3-20 mg. of a virulent human tubercle strain in a suspension of kaolin, mineral oil and normal saline; embolic tubercles were produced in the lungs. Three dogs were inoculated with a similar suspension into the chest wall. A blood sample was taken from the femoral artery of each dog daily, and injected directly into g. pigs. Daily observations were recorded from one to three months; 15 of the 17 dogs injected intravenously showed tubercle bacilli present in at least one blood sample. Three of these dogs died of TB.; they showed the most frequent periods of bacillaemia. Two of the dogs inoculated subcutaneously also showed bacillaemia on at least one occasion.—E. C. Hulse.

Stamatin, N., & Bloch, F. (1939). Caractères des lésions provoquées chez la souris par les trois types de bacilles tuberculeux. [**Character of Lesions Produced in Mice by the Three Types of Tubercle Bacilli**].—*C. R. Soc. Biol. Paris.* **131.** 695-697. [1 ref.]

Virulent strains of human and bovine type *Mycobact. tuberculosis* produce essentially similar lesions in mice following large doses (0·01-0·1 mg.) injected intravenously. Only the lungs develop macroscopic lesions, which may be miliary or exudative in type, the former being fatal within 16-20 days and occurring as large nodules, more or less caseous, either isolated or confluent, usually involving a whole lobe and with massive infection. The exudative lesion (usually resulting from human rather than bovine type infection) is diffuse and is seen histologically to be intense congestion with alveolar oedema, slight leucocytic infiltration of the stroma and rare epithelioid nodules. Small doses of virulent strains or large doses of less virulent strains cause small grey, translucent nodules and only slight infection in 3-4 months.

The liver is rarely grossly affected and bacilli are few compared with those in lung lesions. The spleen is usually enlarged to two or three times the normal size, but without visible nodular lesions.

Virulent strains of avian type *M.t.* never cause visible pulmonary lesions within two months. If mice die before this a grossly enlarged spleen and enlarged liver are found, and the lungs are free from visible or microscopic lesions. Large doses (0·1 mg.) cause grey, transparent nodules if the mice survive more than two or three months. If alive after three or four months all organic lesions are increased and the infection is massive.—C. V. Watkins.

Tiraferri, E. (1938). Sur l'isolement en culture du *Mycobacterium tuberculosis bovis*. [**Isolation of the Bovine Type of Tubercle Bacillus**].—*Boll. Sez. ital. Soc. int. Microbiol.* **10.** 249-251. [In French].

T. studied the need for centrifugation after treatment of suspected material with 25% sulphuric acid or 10% sodium hydroxide and found that there was no advantage in using the centrifuge.—C. V. Watkins.

NAGY, A. H. (1939). **Evaluation of the Tubercle Bacillus Concentration Methods of Petroff, Pottenger, and Chemical Flocculation.**—*J. Lab. clin. Med.* **25.** 67-71. 4 tables. [4 refs.] [Author's summary copied *verbatim*].

Pottenger's dilution-flotation method of concentration gives an average of 33 times as many bacilli as can be found in direct smears of choice particles in routine work. The efficiency of this method is twice that of chemical flocculation and four times that of Petroff's. According to Pottenger, this is as accurate as g. pig inoculation and can detect the presence of as few as 1,000 bacilli in twenty-four-hour collections of sputa, whereas to find tubercle bacilli in a straight smear by microscopic examination requires the presence of 100,000 tubercle bacilli per 1 ml. of sputum.

MEYER, K. (1939). Identification sérologique des infections tuberculeuses humaines à type bovin. [**Serological Identification of Bovine Type Tuberculosis in Man**].—*C. R. Soc. Biol. Paris.* **131.** 470-472. [5 refs.]

M. refers to previous studies of the fractionation of the antibody produced in horses inoculated with smooth strains of bovine type *Mycobacterium tuberculosis* of bovine origin and which later react only to the phosphotungstic tuberculin of Boquet and Sandor. Because the serological activity of this tuberculin is due to proteins it was presumed that the particular antibody was anti-protein. The same antibody was also produced in rabbits inoculated with smooth bovine strains of *Mycobact. tuberculosis* suspended in liquid paraffin, but not by rough strains or by human strains.

In view of the above findings M. made complement-fixation tests on 20 different sera obtained from cases of human tuberculosis due to the bovine type of bacillus, together with control tests on 50 other sera from cases presumed to be due to the human type. His results (5 positive, 3 almost complete fixations and 12 negative, and all controls negative) indicate that the method may prove a quick means of diagnosis in a proportion of human cases due to bovine *Mycobact. tuberculosis.*

Confirmation of the protein nature of the antibody is furnished by the fact that the special tuberculin used in the tests, if previously digested with trypsin, causes no fixation of complement.—C. V. WATKINS.

STAMATIN, N. (1939). Relations entre le développement des colonies filles et l'application de nouvelles variantes chez les bacilles tuberculeux humain et bovin. [**Connexion Between the Development of Daughter Colonies of Human and Bovine Tubercle Bacilli and the Development of New Variants**]. —*C. R. Soc. Biol. Paris.* **130.** 1573-1577. [4 refs.]

Human and bovine tubercle strains were grown on an egg-yolk-serum medium and incubated until small, nodular out-growths were observed on the surface of the older colonies. Sub-cultures from the original colonies and the daughter colonies were made on the same medium. The daughter strains showed considerable variations and grew more rapidly than the parent strains, which showed uniform growth. The daughter strains did not give rise to further daughter colonies on sub-culture. By titration of the two different types of colony on mice, rabbits and g. pigs it was found that the daughter colonies were avirulent in the case of two human strains and one bovine strain. These avirulent variants were not observed in those cultures where no daughter colony formations had occurred. —E. C. HULSE.

CARVALHO, A., & VIDAL, C. (1938). Influence de l'acide l-ascorbique sur le développement du bacille de Koch dans les milieux liquides de culture.

[Influence of L-Ascorbic Acid on the Development of Tubercle Bacilli in Liquid Culture Media].—*C. R. Soc. Biol. Paris.* **129.** 687-689.

A human tubercle strain was cultivated on three different liquid media containing l-ascorbic acid in concentrations varying from 0·1-0·0001 % ; control flasks without l-ascorbic acid were also inoculated. Observations were recorded during a period of 45 days. On Sauton's medium no appreciable difference in growth was recorded. On Beck and Proskauer's medium the optimum growth was observed in those flasks containing 0·1 % l-ascorbic acid. In all flasks the growth was enhanced to a certain extent. On Kirchner's medium no differences in growth were seen, although some slight increase in growth was observed in the initial stages in the flasks containing the highest concentration of l-ascorbic acid. The authors conclude that l-ascorbic acid appears to enhance the growth, although the scope of the experiment was insufficient to enable any definite conclusions to be drawn.

—E. C. Hulse.

Anderson, R. J., & Creighton, M. M. (1939). **The Chemistry of the Lipids of Tubercle Bacilli. LVII. The Mycolic Acids of the Avian Tubercle Bacillus Wax.**—*J. biol. Chem.* **129.** 57-63. 2 tables. [4 refs.] [Authors' summary copied *verbatim*]. [See also *V. B.* **9.** 753].

1. The two principal hydroxy acids of high molecular weight contained in the avian tubercle bacillus wax have been named avian α- and β-mycolic acid.

2. Avian α-mycolic acid when heated to 210-255° under 1 mm. pressure decomposes and a branched chain pentacosanoic acid, $C_{25}H_{50}O_2$, m.p. 78-79° distils off in a yield of 25 per cent.

3. Avian β-mycolic acid when heated to 280-295° under 1 mm. pressure decomposes and yields 21 % of normal tetracosanoic acid, $C_{24}H_{48}O_2$.

4. The non-volatile residues that remain after pyrolysis can be separated into several fractions as white amorphous powders that vary in physical properties and in chemical composition.

Lester, Vera. (1939). **Saprophytic Acid-Fast Bacilli as a Source of Error in Diagnostic Work.**—*Acta tuberc. scand.* **13.** 251-285. 2 figs., 4 tables. [10 refs.] [In English]. [Author's summary copied *verbatim*].

130 strains of acid-fast saprophytic bacilli have been isolated in the years 1932-36 from human material examined at the tuberculosis department of the State Serum Institute.

An increase of the number was seen following two improvements in the technique : the change from Petroff's medium to an egg-asparagin-medium containing ¾ % Glycerol, and the replacing of NaOH by 6 % H_2SO_4 for homogenization.

A description is given of the methods used for discerning a saprophytic acid-fast bacillus from a tubercle bacillus. Three procedures have proved of value : (1) Prolonged observation of the primary culture. (2) Subculture on solid egg-medium and in Besredka's fluid medium. (3) Intracutaneous inoculation into g. pigs.

The history of the strains is given in tabular form, including the source of the specimens, some cultural reactions and the result of the g. pig inoculation. Some strains of special interest are described in detail.

No attempts are made to classify the acid-fast saprophytic bacilli described here, as no adequate serological or biochemical methods are as yet available.

In 55 of the 130 strains the colonies had a bright orange colour. It is not possible to determine if they form a group apart, but these strains seem at least to have some features in common.

None of the 130 strains were pathogenic to g. pigs in the doses used, but the most dysgonic of those growing in orange coloured colonies were able to produce small abscesses by intracutaneous injections. No propagation was seen, and the abscesses healed spontaneously in a few weeks. Some of these strains have been examined by injection of higher doses in g. pigs and rabbits, but only local regressive lesions were seen.

One avian tubercle bacillus is included in the material. Culturally it showed some resemblance to the dysgonic, chromogenic saprophytes, but by virulence test in g. pigs and rabbits it was classified as a typical avian tubercle bacillus.

Only about 1/5 of the strains resembled the eugonic, more or less pigmented cultures most often described in older literature as acid-fast saprophytic bacilli.

The source of the saprophytes found in cultures from human material could not be determined, but as saprophytes are known to be ubiquitarian several possibilities present themselves. In some cases, however, it seems probable that the saprophytes were brought into the samples at the hospital, in a few other cases the laboratory must be suspected.

It was found that the risk of meeting saprophytes has increased with the introduction of easier and better cultural methods.

In diagnostic work it should always be remembered that many of the saprophytes show much resemblance to tubercle bacilli, specially to atypical strains of tubercle bacilli. It should, however, be emphasized that the atypical strains are scarce. If a strain is not easily recognized as a typical human or bovine tubercle bacillus, it should not be discarded until it is sufficiently examined by cultural and animal tests.

CARNE, H. R. (1939). **A Bacteriological Study of 134 Strains of** *Corynebacterium ovis*.—*J. Path. Bact.* **49.** 313-328. 6 figs. on 2 plates, 2 tables. [Numerous refs.] [Author's summary copied *verbatim*].

The morphological and cultural characters of 134 strains of *C. ovis* isolated from 133 sheep and one cow are described.

Certain strains produce a haemolysin capable of giving rise to haemoglobinuria or icterus when inoculated into sheep, particularly by the intravenous route. Haemolysis can be demonstrated *in vitro* in the depths of blood agar plates. It is increased by the presence of serum, unaffected by fermentable carbohydrate (glucose) and inhibited by the presence of free oxygen.

The cells of various species of animals differ in sensitivity to the haemolysin, in the order guinea-pig>rabbit>horse>sheep.

Haemolysin is apparently closely linked with the bacterial cells and could not be demonstrated apart from them. It is apparently thermolabile and non-antigenic and appears to be unrelated to exotoxin.

The capacity to produce haemolysin varies with different strains, and there is a tendency for mixed types of colonies to develop in subcultures from single colonies.

GRAHAM, R., LEVINE, N. D., & HESTER, H. R. (1939). **Erysipelothrix Rhusiopathiae Associated with a Fatal Disease in Ducks.**—*J. Amer. vet. med. Ass.* **95.** 211-216. 2 figs., 2 tables. [18 refs.]

Between 10,000 and 12,000 ducklings about 10 weeks old succumbed to a septicaemia-like disease within a period of four months. Other birds which survived were unthrifty and some had chronic arthritis. These losses occurred on a farm on which 46,000 ducklings were hatched and fattened during the preceding 11 months.

The principal losses occurred in a newly constructed house. As there had not been any contact with pigs or other animals with *E. rhusiopathiae* [the bacillus of swine erysipelas] infection and no pig products had been fed, the incidence of the disease seemed to link up infection with environmental factors in the new house.

During the outbreak 140 ducks were sent to the laboratory for examination. Many were decomposed on arrival, but others showed evidence of septicaemia, and from 6 ducks an organism having the morphological, cultural and serological reactions of *E. rhusiopathiae* was isolated. Streptococci were obtained from 32 birds and pasteurella-like organisms from 2 birds. The *E. rhusiopathiae* was shown to be pathogenic experimentally for young ducks, pigeons and mice; mature ducks were resistant. 16 ducks injected with the streptococci isolated remained unaffected.

Efforts to prevent losses on the farm by means of swine erysipelas immune serum and vaccine failed.—Gwilym O. Davies.

Lovell, R. (1939). **The Isolation of *Pasteurella septica* from the Udder Secretion of a Cow.**—*Vet. Rec.* **51.** 747-748. [4 refs.]

From the udder secretion taken from a fatal case of bovine mastitis on the second day of illness, when systemic disturbance was shown, *Pasteurella septica* was isolated by culture in deep ox-blood agar plates. Its morphology and cultural and pathogenic properties are described. This and two previous records of bovine mastitis due to pasteurella infection are compared with cases of acute pasteurella mastitis in sheep in America, terminating in induration of the udder. These cases are regarded as general processes of which mastitis is a local manifestation. L. correlates them with mastitis of internal origin due to various other bacteria in contrast with contagious streptococcal mastitis of external origin.—R. O. Muir.

le Roux, G., & Gillon, A. (1939). Sur une épizootie de pasteurellose ayant sévi en Annam chez des buffles, des boeufs et des porcs. [**An Epizootic of Pasteurella Infection in Annam in Buffaloes, Cattle and Pigs**].—*Rec. Méd. vét. exot.* **12.** 65-80. 12 tables.

Towards the end of 1937 a sudden outbreak of what proved to be pasteurellosis occurred in pigs and buffaloes, and to a less degree in cattle, in villages in Central Annam. To confirm the nature of the disease a culture was obtained from a young bull from one village and from a young pig from another, and cultural and biological tests were carried out. A pasteurella pathogenic for the g. pig, rabbit, ox and pig was obtained in each case. Cross-immunity tests supported the identity of the organisms. Vaccines prepared from these two strains were then prepared and compared with a vaccine prepared from a " barbone " strain used for routine vaccine preparation. All three vaccines protected pigs in cross-infection experiments, but vaccines from the recently isolated strains did not afford complete protection to calves against " barbone." This pointed to a porcine strain as the cause of the outbreaks.

Apart from recording the natural occurrence of " barbone " in pigs, this article also shows that pigs can be successfully vaccinated against the disease. —Gwilym O. Davies.

Topacio, T. (1939). **Hemorrhagic Septicemia in Indian Buffaloes [in the Philippines].**—*J. Amer. vet. med. Ass.* **94.** 492-495. 3 figs. [3 refs.]

In a description of the first reported outbreak of haemorrhagic septicaemia in Indian buffaloes in the Philippines, T. emphasizes the difficulty of diagnosis by microscopic, cultural and even biological methods and gives an instance of positive

results obtained by inoculation of a series of two rabbits, two g. pigs, two rats and two mice after failure to detect infection by microscopic examination of smears of the blood and spleen. Possible causes of the outbreak are summarized and vaccination and quarantine are recommended as prophylactic measures. Of 1,589 animals vaccinated one died 48 hours after injection, probably through infection prior to vaccination.—R. O. Muir.

Brandstetter, S. (1939). Pathologisch-anatomische und histologische Untersuchungen über Tularämie und Pseudotuberkulose (Rodentiose) beim Meerschweinchen. [**Pathology and Histopathology of Tularaemia and Pseudotuberculosis in G. Pigs**].—*Z. InfektKr. Haustiere.* **54.** 238-254. 3 figs. [Numerous refs.]

The histopathology of tularaemia was studied in eight infected g. pigs. The only macroscopic lesions were necrotic foci in the liver, spleen and lymph nodes. Histologically these consisted of clumps of epithelioid cells showing central necrosis, with collagen fibres towards the borders of these overgrowths. The liver showed two types of inflammation—in the early stage there were minute orange foci and few epithelioid cells, whilst in older cases there were larger yellow nodules composed of epithelioid cells with secondary necrosis in evidence. The first type of lesion was characteristic of the early stage and progressively less marked as the disease advanced. The spleen and lymph nodes showed signs of irritation of the reticulo-endothelial tissue. The causal organism was never seen in the above lesions in stained sections.

The histopathology of pseudotuberculosis was studied in four g. pigs. Nodules were present in the liver, spleen, lymph nodes, lungs and rarely also in the heart and adrenals. Here as in tularaemia the lesions consisted histologically of epithelioid cells and there was central necrosis of the lesions, but in pseudotuberculosis the destruction of nuclei occurred much more rapidly than in tularaemia. The spleen and lymph nodes were affected in much the same way as in tularaemia (irritation of the reticulo-epithelial system). Leucocytosis had taken place in the more long lasting cases and the causal bacteria were readily seen in sections, particularly in the early stage.

It is concluded that tularaemia and pseudotuberculosis in g. pigs are difficult to differentiate, but that on the basis of the findings described in this article it can be done.—Sassenhoff (Munich).

Parr, L. W. (1939). **Coliform Bacteria.**—*Bact. Revs.* **3.** 1-48. 1 fig. [Num. refs.]

Although the pneumonia bacillus of Friedländer is about the oldest member of the coliform group it has only recently been re-accepted as coliform. It has been kept apart because of its habitat in the respiratory tract, but is now recognized as closely allied to *Bact. aerogenes.*

In water supplies especially is it important to distinguish between coliform organisms of faecal and those of other origin. There are four tests of importance for this purpose, namely :– (a) the production of indole, (b) the methyl-red test, (c) the Voges-Proskaur test and (d) the utilization of citrate as a sole source of carbon. Generally speaking *Bact. coli* gives positive reactions with one or other or both of the first two tests and negative with the latter two ; *Bact. aerogenes* gives a negative reaction with the first two tests and a positive with one or other or both of the latter ; the intermediate section gives other combinations ranging from all positive to all negative reactions. Many other tests such as motility,

capsulation, fermentation of saccharose or production of H_2S are less useful and some confuse classification.

From the ecological point of view, however, coliform organisms, many of which defy classification, are concerned in pathological processes in man, animals and plants. In animals, coliform bacteria cause " scours " in calves, diarrhoea in foals and pigeons, infectious enteritis in lambs and infectious diarrhoea in chicks. In man, they are associated with gastro-enteritis, suppuration, diarrhoea and especially cystitis and pyelitis. Coliform bacteria are also of uniform occurrence in the intestinal tract and the typical *Bact. coli* is constant, but others such as *Bact. aerogenes* and atypical coliforms may occur. Thus all coliform bacteria must be thought of as possibly faecal in origin. This is significant in virtue of their presence in milk, water, shellfish and other foodstuffs.

Coliform bacteria are susceptible to variation and *Bact. coli-mutabile* is cited as an interesting example. Serologically, coliform bacteria are heterogeneous with the possible exception of strains isolated from particular pathological conditions, *e.g.* cystitis in man.

The general view as regards classification is that as coliform bacteria are particularly restless and as many of our tests may give varying results, even with the same strain, then it is futile to give species rank to more than a few of the many types. The group must be thought of as an ubiquitous group of closely related and somewhat unstable bacteria which are graded from the lactose-negative paracolon bacteria to the highly reactive *Bact. aerogenes*. P. prefers to retain the genus *Bacterium* for the entire group of coliform bacteria. [This is the custom of most British bacteriologists]. He cites difficulties, but suggests that there should be five species, namely, *Escherichea coli* (*Bact. coli*), *E. freundii* (intermediates which utilize citric acid as a sole source of carbon), *Aerobacter aerogenes* (*Bact. aerogenes*), *A. cloacae* (*Bact. cloacae* which liquefies gelatin), and *Klebsiella pneumoniae* (Friedländer's pneumobacillus). Bergey has a similar division of the tribe *Escherichieae* into the three genera with more species in the genus *Klebsiella*.
—R. Lovell.

Lewis, K. H., & Hitchner, E. R. (1936). **Slow Lactose-Fermenting Bacteria Pathogenic for Young Chicks.**—*J. infect. Dis.* **59.** 225-235. 3 tables. [Numerous refs.]

A description is given of three identical strains of bacteria, which were isolated from diseased chicks from broods in which the mortality rate ranged from 32-50%. The chief feature of these bacteria is their slow utilization of lactose, in which the production of acid and gas is delayed for 2-5 days ; if, however, they are passaged through lactose broth they acquire the property of fermenting lactose in 24 hours. Another characteristic is their tolerance for brilliant green, and the authors recommend the use of this dye in media for isolating these organisms. They consider that these strains represent a distinct type and are intermediate between the rapid lactose-fermenting *colon-aerogenes* and the non-lactose fermenting paratyphoid sub-groups. The morphological, cultural, physiological and pathological features of these bacteria are given.—Hugh N. Spears.

Todorovitch, K. (1938). Paratyphus c Kunzendorf. Quelques faits étiologiques, épidémiologiques et cliniques. [**Some Aetiological, Epidemiological and Clinical Aspects of** *Salmonella cholerae-suis* **var.** *kunzendorf*].—*Pr. méd.* **46.** 687-689. 5 graphs.

T. is of the opinion that infection with *S. cholerae-suis* var. *kunzendorf* is not uncommon in human beings in Yugoslavia and elsewhere. Infection appears to

occur chiefly amongst those in contact with pigs, and amongst consumers of pork and its products.—A. A. B. Ellis.

Fitch, C. P., Boyd, W. L., Bishop, Lucille M., & Kelly, Margaret. (1939). **Localization of Brucella Abortus in the Bovine Uterus.**—*Cornell Vet.* **29.** 253-260. [10 refs.]

Although occasional reports have been published on the presence of *Br. abortus* in the uterus at various periods after abortion or calving, the general opinion has been that the organism is quickly eliminated from the uterus after abortion or full term parturition. The present studies were made on cattle sold for slaughter after agglutination tests on herds under Federal-State supervision. Most of the animals had recently become reactors before being sold for slaughter. Uterine mucosa was removed under precautions as to sterility and ground up with sterile sand and filtered; each sample was inoculated intraperitoneally into two g. pigs.

Of 93 non-gravid uteri examined, *Br. abortus* was isolated from 51 %. 27 of the 93 showed evidence of recent parturition and 85 % of these proved positive. 66 showed no evidence of recent parturition and *Br. abortus* was found in 24 (36 %). 41 gravid uteri were examined. All which showed a pregnancy of less than 4½ months were negative, and 13 (45 %) of those with pregnancies of 4½ months or longer proved positive. *Br. abortus* may be found in the non-gravid uterus long after involution is completed (up to 195 days). Infection was demonstrated in the uterus of a two-year-old animal which had apparently not been gravid.

—S. J. Gilbert.

McEwen, A. D., Priestley, F. W., & Paterson, J. D. (1939). **An Estimate of a Suitable Infective Dose of *Br. abortus* for Immunisation Tests on Cattle.**—*J. comp. Path.* **52.** 116-128. 4 tables. [15 refs.]

The authors briefly review previous work on the effects of the use of live vaccine; they draw attention to the variation and lack of standardization of the infecting doses given, and refer to the possibility of large doses overwhelming immunity due to vaccines of more or less low virulence. Experiments were carried out to determine a suitable infective dose for immunity tests, using conjunctival inoculation. Fifty heifers, negative to the agglutination test, were divided into five groups of ten each, and when well advanced in pregnancy were infected with a descending dosage :– group (1) received 1,460,000,000 organisms, group (2) 14,600,000, group (3) 1,460,000, group (4) 146,000 and group (5) 1,460. The animals were tested at intervals and the foetus and membranes or uterine swabs, and the colostrum were examined for *Br. abortus*. The results, which are illustrated by tables, show that all animals in group (1) were infected and seven aborted; in group (2) nine animals were infected with 8 abortions and one premature calving; group (3) showed seven infected animals and five abortions or premature calvings, and in group (4) five animals were infected and three abortions occurred. In the last group all calved normally, but two showed slight infection. The interval elapsing between infection and the appearance of agglutinins increased inversely with the number of infecting organisms. In cases where abortion took place in less than 60 days after infection, and these occurred only in groups (1) and (2), the foetal membranes were most diseased, and they showed extensive necrosis; this condition is only rarely found in animals aborting under natural conditions.—S. J. Gilbert.

McEwen, A. D. (1939). **The Demonstration of Immunity in Cattle Vaccinated with a Non-Virulent Strain of** *Br. abortus*.—*J. comp. Path.* **52.** 129-131. 3 tables. [2 refs.]

Ten cattle were inoculated with 8 c.c. of living suspension of an avirulent strain of *Br. abortus*, of opacity equal to no. 6 tube Brown's scale, and the inoculation was twice repeated during the next three months. Five of the cattle were subsequently infected with 1,460 million organisms in the conjunctiva and five received 14,600,000. An increased resistance was apparent in the case of the smaller infective dose ; the larger infective dose caused a more severe infection.—S. J. G.

Beach, B. A. (1939). **Resistance to Bang's Disease of Cattle that Have Passed through an Artificially Induced Outbreak and Recovered.**—*J. Amer. vet. med. Ass.* **94.** 374-375.

All the cows of a herd of 44 were infected artificially with *Br. abortus* ; 12 of them later became negative reactors. These 12 were re-infected by instillation on to the conjunctiva. The 12 recovered cows calved normally, and g. pigs inoculated with milk and uterine fluid were infected in only one case. In a second herd 6 similar cows were re-infected ; 4 calved normally and the other 2 were not pregnant. 28% of both herds had become negative after artificial infection. 75% of control cattle aborted.—S. J. Gilbert.

I. Albiston, H. E. (1938). **The Control of Contagious Abortion.**—*Aust. vet. J.* **14.** 136-140.

II. Hindmarsh, W. L. (1938). **The Control of Brucellosis of Cattle.**—*Ibid.* 140-141.

I. The methods of eradicating bovine contagious abortion from dairy herds are briefly stated. It is emphasized that although present knowledge is deficient in many respects, sufficient is known to permit its elimination from infected herds. This is one of the most serious diseases of cattle in Australia, but little progress has been made towards its eradication. This may be partly explained by the varying conditions in the different states which militate against the adoption of a common policy except on the broadest principles.

Without compensation the control of contagious abortion on the average dairy farm, where the degree of infection is moderate to heavy, is a hopeless task. The only solution appears to be in the development of an efficient preventive method. The use of vaccines from avirulent strains of *Brucella abortus* seems to offer most encouragement in this direction.

II. Experience in New South Wales indicates that by regular testing, herds can be made free from brucella infection and can be kept free by suitable control measures. While the laboratory plays an important part in carrying out serological tests, the field officer has an equally important function in ensuring adequate hygienic control of the herd and tracing sources of infection.—H. B. Carter.

Little, G. M. (1938). **Undulant Fever in Edmonton, Alberta.**—*Canad. publ. Hlth J.* **29.** 542-544. 2 tables. [1 ref.]

During nine months of 1937-38 ten cases of undulant fever were reported. Raw milk constituted 23% of the city supply. Owing to local circumstances it was impossible to have all milk pasteurized, so the agglutination test was applied to all dairy herds. An agglutinin titre of 1:200 or greater was considered positive ; between 1:100 and 1:200 was considered suspicious, as was also 1:50 to 1:100 if positive animals were in the herd. Otherwise titres of less than 1:100 were regarded

as negative. On this basis 134 animals of the 1,115 tested were removed (12%). No known case of undulant fever had developed five months after this was done.
—R. GWATKIN.

KERBY, Grace P. (1939). **Nicotinic Acid and Thiamin Hydrochloride as Growth-Promoting Factors for Brucella.**—*J. Bact.* **37.** 495-499. 4 figs. [5 refs.]

A study was made of the effect, on the growth of four stock strains and two recently isolated strains of *Br. abortus* and a stock *Br. melitensis* strain, of adding to "Bacto" tryptose agar, nicotinic acid in amounts of 4-40 mg. per litre and thiamin hydrochloride (vitamin B_1) in amounts of 0·01-100 mg. per litre. A uniform inoculum of 0·05 c.c. of a suitably diluted broth culture was used for each plate. The optimal growth-promoting concentrations of nicotinic acid and thiamin hydrochloride were found to be 30 mg. and 25 mg. per litre respectively. While growth of some strains was improved more by one than the other of these substances, all *Br. abortus* strains grew on media containing both substances as well as or better than when they were used separately. On the enriched media, *Br. abortus* colonies could be counted fully 24 hours before those on unenriched media. The single stock strain of *Br. melitensis* was slightly inhibited by either factor.—R. O. MUIR.

VISWANATHAN, G. R. (1937). **Prevention of Black Quarter in India and the Organisms Responsible for this Condition.**—*Proc. Anim. Husb. Res. Wkrs Conf. India, 1936.* pp. 61-63. Discussion pp. 63-64. New Delhi: Govt. India Press.

V. expressed the opinion that infection generally takes place at the time of teething and that parasites play some part in the method of infection. He considered that a bivalent vaccine should be used (*Cl. chauvoei* with *Cl. septique*). HADDOW stated that the epidemic outbreaks of the fulminating type are almost invariably due to *Cl. chauvoei*, while sporadic cases are usually due to *Cl. septique* or more rarely to other members of the gas gangrene group. A vaccine is the most powerful immunizing agent, and the vaccine used, which is prepared from several strains of organisms isolated from actual cases in India, confers immunity experimentally against all strains submitted by field workers in India.—J. A. G.

SCHOOP, G. (1939). Die Empfindlichkeit des Fuchses für Botulinustoxin. [**Susceptibility of Foxes to** *Clostridium botulinum* **Intoxication**].—*Dtsch. tierärztl. Wschr.* **47.** 463-465. 1 fig. [5 refs.]

Cl. botulinum Type A toxin was tested on foxes. Subcutaneous injection of 50,000 mouse-lethal doses killed a fox in five days, while half this dose was not fatal. 48 hours after inoculation there was inco-ordination of movement, followed by paralysis, but without loss of consciousness. At autopsy the mucosae of the stomach and small intestine were congested and swollen, and the liver and spleen were congested. Feeding of toxin failed even with a dose of 100 million mouse L.D., but the feeding of a dose of 2½ million mouse L.D. of a toxin-containing culture caused death. *Cl. botulinum* could, in this case, be cultured from various organs.

S. concludes that botulism is not likely to be a source of trouble in fox-breeding, but suggests that suspect meat be cooked immediately before feeding.—H. E. H.

FLOYD, T. M., & DACK, G. M. (1939). **The Isolation of Bacterium Necrophorum in the Presence of Proteus.**—*J. infect. Dis.* **64.** 269-272. 4 tables. [8 refs.]

In an attempt to find some factor which would prevent the swarming of proteus and so assist in the isolation of *Fusiformis necrophorus*, the effects of 95%

alcohol, 5% phenol, alcohol-flooded plates, luminal, and chloral hydrate were studied. Most successful and consistent results were obtained when 5·5-6% by volume of 95% ethyl alcohol was added to blood agar, as this inhibited the swarming of proteus but had little effect on the growth of *F. necrophorus*. Excellent results were also obtained by the addition of immune serum against the specific strain of proteus, but the practical value of this method was doubted because of the strain specificity and the antigenic heterogeneity of the proteus group.—J. R. Lawson.

Marsh, H., & Wilkins, H. W. (1939). **Actinobacillosis in Sheep.**—*J. Amer. vet. med. Ass.* **94.** 363-364. 3 figs. [5 refs.]

Sixty out of two thousand ewes had died as an indirect result of this disease, as owing to the presence of lesions there was interference with feeding. The lesions are described. Sections through the affected lips were characteristic in appearance. *Actinobacillus lignieresi* was isolated from lip abscesses and lymph nodes.—F. H. Manley.

Brion, A. (1939). L'actinomycose du chien et du chat. [**Actinomycosis of the Dog and the Cat**].—*Rev. Méd. vét., Toulouse.* **91.** 121-159. 4 figs., 6 plates. [Numerous refs.]

The literature dealing with this subject is reviewed. The subcutaneous form of the disease was most frequently encountered. A description is given of the lesions observed. The disease is chronic in nature with severe abscess formation. The administration of iodine combined with local treatment is efficacious.

Two cases affecting the peritoneum, one in the dog and one in the cat, are described. Two attempts at artificial intraperitoneal infection failed.

Two cases of bone infection in the cat are described. The bone was markedly changed by a rarefying osteitis, and a myelitis. The macroscopic and microscopic lesions are described. The disease is severe and rapid, with abundant pus formation.

A mycological study of the causal organism is given, particular attention being made to methods of staining and cultural characters. The classification of the organisms is discussed. It is an *Actinomyces*, but the exact species was not determined.

The disease was reproduced artificially in dogs, g. pigs and rabbits.—F. H. M.

Umbreit, W. W. (1939). **Studies on the Proactinomyces.**—*J. Bact.* **38.** 73-89. 3 tables. [17 refs.]

Eighteen acid-fast and eleven non acid-fast strains of *Proactinomyces* were subjected, with ten *Actinomyces* species, to varying cultural and environmental conditions. Absence of spore formation in the *Proactinomyces* group was considered a valid criterion for differentiation from the *Actinomyces* genus. In the opinion of U., the limits between the genus *Proactinomyces* and the *Corynebacterium* and *Mycobacterium* genera could not be clearly defined owing to indeterminate mycelium formation. Two sub-genera were recognized within the genus *Proactinomyces* by morphological and cultural characteristics.—R. O. Muir.

Danbolt, N., & Mossige, K. (1939). Sølvrev som smittekilde for Trichophyti hos mannesker. [**Silver Foxes as Source of Trichophyton Ringworm in Man**].—*Norsk VetTidsskr.* **51.** 85-92. 6 figs. [English summary].

The authors point out the possibility that silver foxes, the breeding of which is stated to be gaining in importance from year to year in Norway, may be a source of infection with ringworm of the personnel in charge of the animals. This view

is supported by the fact that in 1937 silver foxes on an important farm were found to be affected with ringworm due to *Trichophyton gypseum asteroides*, which was also isolated from ringworm cases among silver fox breeders treated that year at the dermatological clinic of the University of Oslo.

I. Joyeux, C., & Sautet, J. (1938). Action du staphylocoque doré sur le développement en culture, du *Microsporum felineum* Fox et Blaxall, 1896. [**Action of Staphylococci on the Development in Culture of** *Microsporon felineum*].—*C. R. Soc. Biol. Paris.* **129.** 973-975. [4 refs.]

II. Grigoraki, L., & David, R. (1939). Caractères biochimiques du *Microsporum canis* (Bodin, 1897), Grigoraki et Guiart, emend. 1928. [**Cultural Characters of** *Microsporon canis*].—*Ibid.* **130.** 203-205. [4 refs.]

I. Comparisons were made of the growth of *Staph. pyogenes aureus* and *Microsporon felineum* in separate and combined culture on various media at room and incubator temperatures. The staphylococcus predominated at 37°C. in mixed culture on Sabouraud's medium with the addition of various sugars. Both grew equally well at 37°C. in mixed culture on Sabouraud's medium containing dextrin. At room temperature, *M. felineum* overgrew the staphylococcus on this medium and showed improved growth on other media, especially on nutritive agar where the association of cocci and fungi appeared to exert a favourable effect upon the growth of the latter.

II. In the absence of reliable morphological and cultural criteria for differentiating the various *Microsporon* species, the biochemical characters of *Microsporon canis* were studied with a view to facilitating the differential diagnosis of ringworm. In cultures in milk and gelatin at 20°C., the fungus produced a moderately active protease for casein and a very active gelatinase. Fermentation reactions in liquid media, containing various polysaccharides and glycerin, were characteristic and the test for indol production was negative. These biochemical tests were regarded as a useful basis of differentiation from the *Trichophyton* and *Achorion* genera.

—R. O. Muir.

DISEASES CAUSED BY PROTOZOAN PARASITES

Pauli-Magnus. (1938). Ueber Trypanosomiasis bei Hunden an der Küste von Kamerun. [**Canine Trypanosomiasis on the Cameroon Coast**].—*Arch. Schiffs- u. Tropenhyg.* **42.** 549-550.

European dogs imported into the coastal areas of the Cameroons usually become emaciated after about two months, although their appetite is maintained, and in spite of treatment for worms they continue to lose condition and eventually die from debility. The author was able to detect an infection with *Tryp. congolense* in one of these animals, and to cure it with three injections of germanin. [This drug is not believed to have any value for the treatment of *T. congolense* infection]. No trypanosome infection could be detected in native dogs, and it is suggested the unaccustomed heat may reduce the vitality and resistance of imported animals.—U. F. Richardson.

Corson, J. F. (1939). **A Fifth Note on the Infectivity to Man of a Strain of Trypanosoma rhodesiense: Three Further Passages through Antelope and Tests on Man; Two Charts of the Whole Experiment.**—*J. trop. Med. (Hyg.).* **42.** 5-7. [1 ref.] [See also *V. B.* **9.** 693].

CORSON, J. F. (1939). **A Further Note on Some African Volunteers in Experimental Work with** *Trypanosoma rhodesiense*.—*Ann. trop. Med. Parasit.* **33.** 97-99. 1 table. [2 refs.]

In the first paper C. records that after three further passages of his experimental strain of *T. rhodesiense* through antelope and *G. morsitans* it still remained infective to man. Cases are recorded in which flies failed to infect several of the volunteers on whom they fed, but infected others, and the author suggests that it is practically impossible to prove that a strain has lost its infectivity to man. This strain has now been passaged 22 times by *G. morsitans*, 13 passages being through sheep and 9 through antelope.

The second paper deals with the effect of trypanosome infection and germanin treatment on the health of the volunteers. The majority of these men suffered some disturbance of health during or soon after their course of treatment with germanin, but are now in excellent health. It seems probable that the disturbance was due to the germanin treatment, and it is noted that several of the treated men had complained of pains in the feet or other areas soon after treatment.—U. F. R.

TALIAFERRO, W. H. (1938). **Ablastic and Trypanocidal Antibodies against** *Trypanosoma duttoni*.—*J. Immunol.* **35.** 303-328. 9 tables. [Num. refs.]

This article records investigations into the antibodies produced in mice to infection with *T. duttoni*, and their comparison with the antibodies produced to *T. lewisi*. In *T. lewisi* infection, in rats treated with serum containing ablastin (reproduction-inhibiting antibody) multiplication of trypanosomes is prevented first by the introduced antibody, and then by a developing natural immunity; in mice, on the other hand, serum containing ablastin to *T. duttoni* inhibits multiplication for about 6 days, but after that young and multiplying forms are encountered. As in *T. lewisi* infection, a trypanocidal antibody is produced against *T. duttoni*. The serum was most effectively trypanocidal when it was obtained from infected mice which, after their trypanosomes had disappeared, were hyperimmunized with a large dose of trypanosomes intravenously, and were bled a week after hyperimmunization. It was of greatest potency when used 24 hours after bleeding. A group reaction could be demonstrated between the antibodies against *T. lewisi* and *T. duttoni*, but homologous serum was distinctly more effective than heterologous.—U. F. RICHARDSON.

PACKCHANIAN, A. (1939). **Natural Infection of** *Triatoma gerstakeri* **with** *Trypanosoma cruzi* **in Texas.**—*Publ. Hlth Rep., Wash.* **54.** 1547-1554. 10 figs. on 10 plates, 1 table. [15 refs.] [Author's summary copied *verbatim*].

Natural infection of *Triatoma gerstakeri* (" blood sucking insect," " kissing bug ") with *Trypanosoma cruzi* has been demonstrated in insects collected in Texas.

MORISITA, T. (1939). **Studies on the Trichomonad, Parasitic in the Reproductive Organs of Cattle. Part I. On the Nomenclature and Morphology. Part 2. Biological Characters. Part 3. Serological Study, with Special Reference to Agglomeration- and Agglutination-Phenomena. Part 4. Vital Staining. Part 5. On the Oxidation- and Reduction-Ability.**—*Jap. J. exp. Med.* **17.** 1-6, 7-26, 27-41, 43-55 and 57-63. 1 text fig., 47 figs. on 3 plates, 53 tables, 6 charts. [Numerous refs.] [In English].

I. M. refers to the existing nomenclature of this parasite, and considers *T. foetus* to be the correct specific name. For these studies the parasites were cultured *in vitro*. Fixed and stained forms were of variable size and shape, and active parasites were not constant in their body shape. Details of the morphology

are given, and stress is laid on the position and structure of the blepharoplast, which consists of an anterior group of three granules, and a single posterior granule. Encystation was not established in cultures.

II. The parasite developed best in a culture medium consisting of 5% glucose neutral broth and whole egg agar slant instead of blood agar slant, at 30°-37°C. and having a pH of 6·6-7·8. Fermentation reactions are described. Addition in suitable quantities of the water-extracted components of the trichomonad cell favoured its growth, as did vitamins B and C, pancreatic extracts and sex hormones; vitamin A and thyroid hormone were injurious. Anaerobic cultures were much more favourable for growth than aerobic ones. Attempts to produce abortion in pregnant rabbits by injection of filtered culture fluid failed. Resistance of the parasite to drying was almost nil, and at various temperatures the duration of survival was always longer than the time during which further culture was possible. Non-serological clumping (agglomeration) was observed and its relation to temperature studied.

III. Immunological reactions of two pure strains of *T. foetus* were studied by means of agglomeration and agglutination tests. M. is doubtful whether there is any actual difference between serological and non-serological agglomeration; in both phenomena, but to a lesser degree in the latter, an abnormal amount of mucous fluid, especially around the axostyle, was a marked feature. As in the case of *Trypanosoma lewisi*, the titre of agglutinin of *T. foetus* was always lower than that of agglomeratinin. The effect of heat on both antibodies was equal. Separation of the antibodies by Castellani's absorption test was difficult.

IV. The effects of vital staining with 71 dyes tested on *T. foetus* are recorded. Both temperature and pH of the culture medium are important factors. At high temperatures the time required for absorption and excretion of the dye is shortened. In old cultures with a decreased pH value, the parasite frequently does not respond to staining, by reason not only of the acidity but also of the functional inactivity of the parasite. The staining possibilities of the organellae of the trichomonad were examined, and at no time did the parabasal body react positively.

V. Trichomonads in young and old cultures were examined for their oxidation and reduction powers. From the results it appears that healthy parasites have a stronger reduction and oxidation capacity than degenerate forms; whilst forms in young cultures have greater reduction than oxidation power, the opposite holds true for old cultures. The quantity of oxydase was directly proportional to the reduction power and co-existed with reduction localities only in the cytoplasm, whilst oxidation localities were distributed in the cytoplasm, nucleus and blepharoplast. There was no evidence of the presence of peroxydase.—M. L. BINGHAM.

ROGICK, F. A. (1938). Eimeriose caprina em São Paulo. [**Coccidiosis of Goats in S. Paulo**].—*Rev. Industr. anim.* **1.** No. 3. 17-23. 2 figs. [13 refs.]

100% of adult goats in São Paulo are healthy carriers of *Eimeria arloingi*; no illness due to the infection was found even in young goats.—S. TORRES.

CHURCHWARD, R. E. (1938). **Some Observations on the Field Inoculation against Tick Fever.**—*Aust. vet. J.* **14.** 149-152. [1 ref.]

C. records his observations in North Queensland during 1936 on the inoculation of 4,338 steers ranging in age from 2-6 years. Reservoirs infected with *Babesia bigemina* and *Anaplasma centrale* of South African origin were used on the principle that this combination confers considerable resistance to natural infection with *Babesiella argentina* [*Babesia argentina*] and *Anaplasma marginale*. The only species found in smears from reacting animals in this series was *Babesiella*

argentina. Acaprin, akiron, and piroblue were variously used in the treatment of severe reactors.—H. B. Carter.

Tóth, A. (1938). Baromfispirochaetosisra vonatkozó vizsgalátok. [**Research into Spirochaetosis of Poultry**].—*Állatorv. Lapok*. **61**. 165-168 and 189-191.

Extensive experiments conducted by T. on adult poultry and chickens showed that while neither atoxyl nor immune serum had any curative effect if administered after infection, immune serum gave full protection to the 64 adult hens and 35 six-months-old chickens artificially infected by various methods, either simultaneously with or following upon the administration of serum. Experiments begun with a view to ascertaining the protective effect of atoxyl were abandoned owing to its toxic qualities.

DISEASES CAUSED BY VIRUSES

Findlay, G. M. (1939). **Virus Diseases.**—*Brit. med. J.* Feb. 11th. 257-260. [Numerous refs.]

This article is a useful summary of the present position regarding virus diseases. The subject is treated under the headings of properties and nature of viruses, spread of infection, action of viruses on cells, and immunity.—R. E. G.

Rivadelo, T. F., Vytiaco, P., & Jardiniano, F. (1939). **Report of the Special Committee on Foot-and-Mouth Disease [Philippine Veterinary Medical Association].**—*Philipp. J. anim. Indust.* **6**. 175-182.

The methods of control of F. & M. disease adopted in the Philippines consist in rigid quarantine in infected localities, therapeutic treatment of affected animals, and strict regulation of shipment of animals from infected to other regions. The measures are designed to restrict movement in infected territories until the disease ceases to prevail. Occasionally the slaughter-out policy is employed, but only when small numbers of animals are involved and they are located in a clean area. In general the importation of animals for immediate slaughter is permitted from clean herds in which no case of the disease has occurred within one month previously. More stringent regulations, however, cover the shipments of live animals from infected areas. The policy depends for its effectiveness upon the natural tendency for the disease to die out when localized, and so far it appears to have given satisfactory results. Eradication under the system cannot be hoped for, and the disease has assumed the form of a mild endemic in certain regions.

—D. D. Ogilvie.

du Toit, P. J. (1939). **The Rinderpest Position in Southern Africa.**—*Fmg S. Afr.* **14**. 131-132.

After giving a brief review of the history of rinderpest in South Africa and referring to the campaign in Tanganyika in 1917 to limit the southward spread, the author discusses the position in that territory from 1937 onward. As a result of a conference in Nairobi in February 1938 the states to the south took steps to create an immune belt of cattle across the cattle country of Tanganyika. This was effective, but could have been done more thoroughly if more funds had been available. There was at that time a possibility of the disease outflanking the belt by going through the game country at each end of it. It was considered that the position was still dangerous. Calves in the immune belt would have to be inoculated and infected foci near the belt eliminated. It was considered that it would be

possible to eliminate rinderpest from both Kenya and Tanganyika territories in about five years if the staff and funds were forthcoming.—E. M. Robinson.

I. Colson, M. (1939). De la préparation du vaccin antipestique dans la pratique courante. [**Preparation of Rinderpest Vaccine in Everyday Practice**].—*Rec. Méd. vét. exot.* **12.** 15-27. 14 graphs.

II. Colson, M. (1939). Le vaccin antipestique en Indo-Chine. Dose optima. [**Rinderpest Vaccine in Indo-China. Optimum dose**].—*Ibid.* 81-88. 9 graphs.

III. Jacotot, H. (1939). Quand doit-on prélever les organes des veaux destinés à la préparation du vaccin contre la peste bovine ? [**Correct Times for the Removal of Calf Material for the Preparation of Rinderpest Vaccines**].—*Bull. Soc. Path. exot.* **32.** 520-525.

IV. Charitat. (1939). Vaccination par le virus saponiné. Virulence du sang au cours de l'établissement de l'immunité. [**Vaccination with Saponin Virus against Rinderpest**].—*Bull. Serv. zootech. Epiz., A.O.F.* **2.** No. 2. 5-6.

I. In Indo-China rinderpest formol vaccine is prepared according to the following formula :– 1 part of pulp of spleen, lung, and gland, 2·25 parts distilled water, and 0·75 parts glycerin ; 7 pts. per 1,000 of commercial formalin are added. C. prepared a vaccine with similar formula but without sterilization of instruments, glassware, or of the fluids used in preparing the emulsion, and compared it with the normal product. Both were sterile 48 hours after preparation and no difference in efficiency could be detected. Further trials included a vaccine prepared with tapwater (pulp 1 pt., tapwater 3 pts., formol 7 in 1,000). This also was prepared without aseptic precautions, and it too proved as effective as the normal vaccine and was sterile 48 hours after preparation. All vaccines retained equal efficiency for at least ten weeks.

Tests of vaccines were in doses of six, ten and 22 c.c., the animals being tested with 2 c.c. of virulent blood three weeks later. The author suggests that the simplified technique eliminates the not inconsiderable expense and trouble of preliminary sterilization, the formol being found sufficient for the purpose.

II. Observations already fully recorded in the previous article are repeated here, and from his results C. concludes that the dosage of vaccine had little effect on the solidity of immunity. If anything the results were slightly in favour of the medium dosage of 10 c.c. (in a calf of 120-130 kg.). There is considerable variation in the efficiency of vaccines prepared from organs of different calves, and in order to maintain a reasonably constant product vaccine must consist of a mixture of material from several calves. The natural resistance of the animal is a variable which must be taken into account when assessing dosage. The cattle of Central Annam infected at long intervals only are very susceptible, while those of Cambodia, where infection is frequent, are much more resistant.

III. J. describes a series of experiments in which vaccines were prepared from precrural and prescapular glands removed from experimentally infected calves at varying stages of the disease. Vaccines were made to the following formula :– 1 pt. pulp, 2·75 pts. water, 0·25 pts. glycerin, 6% toluene. The vaccines prepared were tested in scales of doses ranging from 1 c.c. to 10 c.c., the test animals being inoculated with 2 c.c. of virulent blood 15 days to three weeks after vaccination and their reactions observed. It was found that immunizing power of gland vaccine was first detectable with the first rise in temperature ; the most potent vaccine was that prepared from glands taken at the height of the fever or immediately afterwards ; thereafter, the potency was quite high for two or

three days, when it lessened. At the 10th day the immunizing power was slight. Vaccines prepared from spleen or glands of animals in an advanced stage of the disease were useless. The most potent vaccine under conditions prevailing in Nhatrang was that prepared from glands taken 4-5 days after inoculation of virulent blood.

IV. A repetition and extension of observations made in an earlier paper [*V. B.* **9.** 623]. A group of two calves received 2·5 c.c. each of saponin-virus stored for 16 hours in the refrigerator. There was a characteristic febrile reaction from the 2nd to the 4th days. Tested with 5 c.c. of virulent blood 12 days later they proved immune, while controls developed typical rinderpest. In all cases saponin-virus, stored for from 30 minutes to 16 hours, had conferred a solid immunity. The blood, tested in two cases only, was found to be non-infective on the 8th day after inoculation. [No tests were made of the infectivity of the blood during the febrile period].—H. E. Harbour.

McIntyre, G. (1939). **The Lungsickness Campaign in the Caprivi Zipfel.**—*J. S. Afr. vet. med. Ass.* **10.** 4-12.

This is an account by the author of a trip which he made to the Caprivi Zipfel during the winter months of 1938 to assist in an inoculation campaign against contagious bovine pleuro-pneumonia. Descriptions are given of the wild life, native population, cattle and vegetation of the area. There were about 24,000 cattle in the area and the inoculation was carried out as a protective measure. The vaccine was obtained from the Kabete laboratory, Kenya and was forwarded by air mail and distributed throughout the Zipfel by aeroplane. Three inoculations were carried out on each animal.

There appeared to be very few cattle diseases in the area and the main losses in cattle were due to lions.—E. M. Robinson.

Alexander, R. A. (1938). **Studies on the Neurotropic Virus of Horsesickness. VI. Propagation in the Developing Chick Embryo.**—*Onderstepoort J. vet. Sci.* **11.** 9-19. 2 tables. [5 refs.]

This work was carried out to explore the possibility of the large scale cultivation of horse-sickness virus in the developing chick embryo in case the supply of white mice should be interfered with in any way. The technique employed is described in great detail and certain modifications of the usual technique were introduced. The virus was found to maintain its neurotropic character and multiplication was almost confined to the brain of the embryo, the titre of the virus reaching its highest point after 4-5 days' incubation, after which there was a gradual fall until the virus practically disappeared after 8 days' incubation. The mortality rate in inoculated eggs was only about 4%, and the virus appeared to have no special lethal effect on the embryo. The possibility of using eggs as a reserve in vaccine production was considered feasible.

In an addendum it is mentioned that subsequent attempts to repeat this work in eggs failed for some unexplained reason.—E. M. Robinson.

Generoso, J. D., Coronel, A. B., & Diaz, C. (1939). **Report of the Committee on Hog Cholera [Philippine Veterinary Medical Association].**—*Philipp. J. anim. Indust.* **6.** 157-161.

Swine fever is the most serious obstacle to large scale pig farming in the Philippines. Control measures, until recently, have been in abeyance, but the initiation of a scheme of preventive immunization sponsored by the government and elaborated by the Bureau of Animal Industry promises good results. Under

this plan all pigs over 3-4 months old will be inoculated by the simultaneous serum-virus method. The serum and virus are manufactured on the islands, and will be issued free of charge. Young pigs will be treated with serum when necessary, and the immunity activated by serum-virus at a later date. Although it is not anticipated that the inoculation scheme will eradicate the disease, it is confidently expected that the consequent reduction in mortality will make the rearing of good class pigs an economic proposition.—D. D. Ogilvie.

Kernkamp, H. C. H. (1939). **Lesions of Hog Cholera: Their Frequency of Occurrence.**—*J. Amer. vet. med. Ass.* **95.** 159-166. 1 table.

The principal and most constant gross pathological lesions of hog cholera occur essentially as manifestations of a cardio-vascular syndrome in which the circulation is slowed in definite areas, and rupture of the capillary vessels follows. Haemorrhagic changes, manifested by petechiae, ecchymoses, and suggillations, therefore predominate. Inflammatory reactions, on the other hand, are secondary, and are superimposed upon tissues already weakened by the presence of the virus.

A summary is given of the P.M. findings in 354 cases of hog cholera, of which 48 were artificially induced and 286 were field cases. The percentages given below refer to the incidence in the changes recorded in artificial and natural cases respectively.

The most consistent findings were petechiae and ecchymoses on the surface and in the parenchyma of the kidneys (95·8% and 91·9%), and K. suggests that they are almost of pathognomonic significance. Similar lesions occurred in the urinary bladder (95·8% and 77·6%). The lymph nodes were affected in most cases with a variable degree of hyperaemia (91·6% and 82·1%). The characteristic lesion in the spleen was infarction (68·7% and 58·7%). Haemorrhagic changes in the larynx occurred especially on the oral surface of the epiglottis (66·6% and 58·3%). Lung changes were variable: hyperaemia predominated (60·4% and 42·2%); haemorrhages (41·6% and 24·8%), and inflammation (14·5% and 44·7%) occurred. Haemorrhagic lesions in the large intestine were present in the mucosa (22·9% and 24·8%) and in the serosa (6·2% and 6·2%). Button ulcers were present in only 4·1% and 15·3% of cases.

Evidence of circulatory disturbances was found in the heart, liver, small intestine, stomach and conjunctivae, but the incidence was never more than 10% on the average. Cyanosis of the skin occurred (20·8% and 22·4%) although its manifestation and extent in the individual was liable to wide variations.—D. D. O.

Edgington, B. H., & Schalk, A. F. (1939). **Some Tests with Crystal-Violet Vaccine for Prevention of Hog Cholera.**—*J. Amer. vet. med. Ass.* **94.** 501-509. 2 tables. [5 refs.]

A review of the relevant literature is given. The authors used 14 lots of the vaccine, consisting of ninety parts defibrinated blood of pigs infected with swine fever, to which were added ten parts of 1% phenol solution and five parts of 1% aqueous solution of crystal violet. The susceptibility to swine fever of the experimental pigs, whose weight varied from 20-100 lb., was proved by the injection of virulent virus into representative animals. In an attempt to establish the duration of the immunity produced by the vaccine, it was found that in 36 pigs inoculated with the virus 14-40 days after vaccination, none showed severe reactions, but in a group of 46 pigs inoculated with virus 75-90 days after vaccination, 12 showed very severe reactions and 12 others died. Fifty susceptible pigs were kept in contact with vaccinated pigs for 30 days without giving any indication of having become infected. A comparative study of the immunity produced by the

vaccine in the progeny of serum-virus treated sows and in the progeny of untreated sows showed the degree of resistance to be similar in both instances. Tests were carried out with vaccines obtained from two different laboratories, but no apparent difference in the antigenic properties was found.—J. R. Lawson.

Jansen, J. (1937). Phlegmonen bij varkens na inspuiting met formolvaccin tegen varkenspest. (2e mededeeling). [**Local Swellings in Pigs Following the Injection of Swine Fever Formol Vaccine**].—*Tijdschr. Diergeneesk.* **64.** 1440-1451. [6 refs.]

A continuation of an earlier investigation [*V. B.* **8.** 289] into local cellulitis in pigs injected with a formolized vaccine against swine fever [*V. B.* **8.** 287]. J. here reports the isolation of *Clostridium oedematiens* from the local lesions and states that, as the injections had been made with due regard to asepsis, the contaminant was presumed to be present in the vaccine as issued.

I. Ridala, V. (1937). Sigade influentsa torjest. [**The Control of Swine Influenza**].—*Eesti loomaarstl. Ring.* **13.** 217-231. 1 table. [13 refs.] [English summary].

II. Ridala, V. (1938). Ägedaid ja raskekujulisi sigade influentsa juhte täiskasvanud sigadel. [**Acute and Severe Cases of Swine Influenza in Adult Pigs**]. —*Ibid.* **14.** 129-142. [9 refs.] [English summary].

I. Swine influenza in Estonia occurs in adults as well as in piglets. A vaccine was made from strains of *Haemophilus influenzae suis* isolated from the lungs of infected pigs from several farms. 60 piglets were vaccinated ; 43 received their first dose on the first day, 6 on the 12th day, and 11 on the 15th day after birth. The inoculations were repeated 2-11 times, with doses of 1·2-2·5 c.c. The vaccination was finished when the piglets were 39-55 days old. At the same time pregnant sows were vaccinated three times, before parturition. All the vaccinated piglets were mixed with younger and older pigs already infected with the disease. 30 of the vaccinated piglets were slaughtered at the age of 6-7 months ; 14 (46·7 %) did not show any changes in the lungs, and in 16 (53·3 %) there were slight changes in the cranial lobes of the lungs. *H. influenzae suis* could not be found in the lungs of 22 (73·3 %), but a culture was obtained from the lungs of 8 (26·7 %).

Seven unvaccinated piglets had changes in their lungs ; one of them had small foci, and the six others a widespread catarrhal pneumonia.

II. The clinical symptoms in the affected pigs were loss of appetite, lassitude, accelerated respiration, a wet and deep cough, and prostration. At the inception of the infection some of the sick pigs had temperatures up to 42°C., others had slight fever or a normal temperature at first, but in the later stages the temperature rose. The illness lasted from three days to four weeks. The mortality was generally great, being 100 % on one farm where the disease was introduced by infected piglets. A P.M. examination of 15 pigs was made. All had severe broncho-pneumonia, serofibrinous pleurisy, catarrhal gastro-enteritis, swelling of the lymph nodes, especially those of the thoracic cavity, neck and mesentery, slight swelling of the spleen, and fatty degeneration of the cardiac muscle, liver and kidneys. Most of the pigs examined also showed signs of septicaemia, some had a general jaundice, and inflammatory lesions of the pericardium, peritoneum, and liver substance. *Haemophilus influenzae suis* was grown from the lungs of all the affected pigs, from the spleen, liver and kidneys of seven pigs, from the spleen of one pig, and from the kidneys of two pigs. On the farms where the disease occurred, pigs were kept in bad hygienic conditions.—Elfriide Ridala (Tartu).

WEBSTER, J. H. D. (1939). **The Periodicity of [Human] Influenza.**—*Edinb. med. J.* **46.** 591-599. 1 table, 1 chart. [16 refs.] [Author's summary copied *verbatim*].

(1). An analysis is given of the series of [human—Ed.] influenza epidemics and outbreaks during the present epoch (49 years : 1890 to date).

(2). A double-phase intrinsic cyclical theory, modified from Brownlee's single-phase theory, with a seasonal factor, is presented as accounting for all the main phenomena.

(3). A similar periodicity has been traced in a previous epoch (1729-43).

(4). Influenzal periodicity is closely similar to the periodicity of cancer and other neoplastic diseases : (*a*). A standard period of 33 weeks is evident (Phase (1)) with a ± three weeks' variation ; (*b*). missed periods are often seen : in influenza most commonly in the summer and autumn months ; (*c*). half-periods (or Phase (2) periods) are evident often, apparently due in influenza to a double strain or grouping of infective strains ; (*d*). quarter periods, or less, are very rarely evident or suggested.

(5). Should the theory be established by further research its chief value would be its use in prediction of the possible and probable dates of epidemics and outbreaks. Prophylactic measures could be adopted then for the highly susceptible before each $3\frac{1}{2}$-monthly period, and more widely before a major epidemic was probable, as in February, 1941.

KÖBE, K., & FERTIG, H. (1938). Die Züchtung des Ferkelgrippe- und Swine influenza-Virus. **[Cultivation of Swine Influenza Virus].**—*Zbl. Bakt. I. (Orig.).* **141.** 1-14. 3 figs., 2 tables. [16 refs.]

The viruses of swine and piglet influenza were successfully grown on the chorio-allantoic membrane of fowl embryos. Viruses so produced are infective for pigs and not for mice. The significance of pneumotropism is discussed and it is concluded that this character is developed in a virus as a result of the influence of cell function rather than cell type.—E. J. PULLINGER.

LANDY, L. (1938). További adatok a veszettségellenes oltások után keletkező idegrendszerbeli elváltozások kórszövettanához. **[Changes in the Central Nervous System After Antirabic Vaccination of Dogs].**—*Állatorv. Lapok.* **61.** 237-239. 3 figs.

The nervous system of seven dogs which died from paralysis following antirabic vaccination was examined. In the central nervous system inflammatory processes were found both in the grey and in the white matter, but to a greater extent in the latter. Infiltration was most pronounced in the initial segment of the medulla. Degenerative changes were proportionate to the gravity of the inflammatory symptoms. In five of the cases inflammatory signs were also found in the cerebellum. Here again the white matter was the chief site of the morbid changes. On examination of the peripheral nervous system of five dogs, inflammatory changes were found in one case only, and even here the changes were insignificant and limited to the perineural tissues. No relationship could be discovered between the gravity of changes in the C.N.S. and the occurrence of changes in the peripheral nerves.

SALLES, A. (1937). Pode um morcego hematophago, depois de um certo periodo de eliminação de virus rabico, deixar de apresentar esta caracteristica ? **[Duration of Virus Excretion by Bat Carriers of Rabies Virus].**—*Bol. vet., Brasil.* **1.** 131-132.

During a period of four months following capture, a bat transmitted rabies to

five *garrote* [unable to verify species—Ed.] which were placed with it. At the end of this period it failed to transmit any further infection. Nervous tissue and glandular saliva collected P.M. also proved innocuous.

Oláh, G. (1938). Phenol-Kochsalzlösung als Konservierungsmittel des fixen Virus der Wut. [**Phenol and Common Salt Solution as a Preservative of the Virus of Rabies**].—*Z. ImmunForsch.* **93.** 44-56. 4 tables. [18 refs.]

The action of glycerin in various concentrations and of 0·5 % phenol in normal saline on rabid brain virus was studied with the aid of mice and rabbits. The virus survived for 56 days in pure glycerin and for 77 days in the carbol-saline. It also survived for longer in the carbol-saline than in the carbol-glycerin (glycerin of 30-50 % concentration). O. therefore recommends carbol-saline as a preservative of rabies virus in place of glycerin.—V. Chládek (Prague).

Bobkó, B. (1938). Ebek kötelező védőoltásának eredménye és kihatása a közegészségügyre. [**Results of the Compulsory Inoculation of Dogs Against Rabies and its Public Health Aspect**].—*Állatorv. Lapok.* **61.** 314-318. 2 tables, 5 charts.

A comparison of data supplied by the Pasteur Institute and Hospital of Budapest and the Hungarian National Institute of Animal Health shows that while the compulsory preventive inoculation of dogs against rabies has led to an almost complete disappearance of the disease in dogs in the inoculation areas, the number of persons treated for bites has not suffered a corresponding decrease ; the number of persons bitten by dogs remained practically the same, as well as the number of persons bitten by other animals. The need for the protective inoculation of bitten human beings persists despite the almost complete disappearance of rabies in dogs as a result of compulsory inoculation.

Smith, R. O. A. (1938). **Report of Work on Rabies Immunization at Pasteur Institute of India, Kasauli, 1937.**—*Rep. sci. Adv. Bd, Ind. Res. Fund Ass., 1937.* pp. 64-68. 4 tables.

The results of experiments on human beings indicate an advantage in the use of antirabic serum plus dead vaccine for persons bitten by rabid animals.

Details are given of experiments in connexion with the antigenic properties of phenolized 5 % vaccine, to ascertain whether the vaccine could be improved by fractionating the brain of a sheep which had died of fixed virus rabies, into its ether-soluble and ether-insoluble portions.

Experiments were conducted to ascertain whether the brain of hyperimmunized sheep used for obtaining rabies serum contains fixed virus. It is probable that the amount present is incapable of conferring immunity against infection with the street virus.

An investigation was carried out to test the post-infectional and pre-infectional immunizing values respectively of monkey brain antigen against that of sheep's brain ; the monkey brain virus gave better results.—J. C. Wallace.

Christen, P. (1939). Vakzinationsversuch gegen die Euterpocken des Rindes und ein Beitrag zu deren Diagnostik. [**Diagnosis of, and Vaccination against, " Udder Pox " in Cattle**].—*Inaug. Diss., Zurich.* pp. 24. 6 figs. [Numerous refs.] [Also appeared in *Schweiz. Arch. Tierheilk.* **81.** 53-65 and 108-117].

C. discusses the literature relating to cow pox, and gives a useful review of

the disease, its symptoms, transmissibility to man, treatment, immunity and differential diagnosis.

In the author's district " udder pox " occurs sporadically or in limited enzootics ; it is usually more marked in spring and autumn. In one herd the origin was traced to contact with a vaccinated person. This was shown to be true cow pox : it responded to vaccination without subsequent relapse. In all the other cases an " abortive " type of cow pox was encountered. Lesions were confined to the teats and to a small area surrounding them. Vesicles developed quickly (10-30 hours) and were generally not umbilicate. Swelling was slight unless secondary infection occurred. When lesions were few healing might take only 10 days, but successive crops of pustules tended to develop and the disease might drag on for months. Treatment by ointments had not been satisfactory ; the cows were troublesome to milk, and secondary infection and complications often occurred. Inoculation of vaccine lymph by scarifications of the skin to one side of the vulva, was followed after nine days by a well marked local reaction which persisted for about eight days. A rapid retrogression of " udder pox " lesions resulted but relapse occurred after 4-6 weeks (though the second attack was milder). A second vaccination carried out at this time caused no reaction, and had no effect on the course of the disease. In no case was C. able to transmit this type of " udder pox " by direct inoculation of vesicle fluid, though its contagious character is evident from field observations.—H. E. Harbour.

I. Levaditi, C. (1939). Ultravirus et fluorescence. Constitution complexe des suspensions de corpuscules vaccinaux. [**Ultraviruses and Fluorescence. Complexity of Suspensions of Vaccinia Elementary Bodies**].—*C. R. Soc. Biol. Paris.* **130.** 1175-1179. 3 charts. [8 refs.]

II. Levaditi, C. (1939). Ultravirus et fluorescence. Constitution complexe des suspensions de corpuscules vaccinaux. Ultracentrifugation. [**Ultraviruses and Fluorescence. Effect of Ultracentrifugation on Vaccinia Elementary Bodies**].—*Ibid.* 1180-1181. 1 chart. [1 ref.]

III. Levaditi, C., Krassnoff, D., Reinié, L., & Giuntini, J. (1939). Ultravirus et fluorescence. Numération des corpuscules élémentaires vaccinaux et ultrafiltration. [**Ultraviruses and Fluorescence. Enumeration of Elementary Bodies of Vaccinia by Ultrafiltration**].—*Ibid.* **131.** 35-39. 2 graphs. [2 refs.]

IV. Levaditi, C., Le-Van-Sen, & Reinié, L. (1939). Ultravirus et fluorescence. Comportement à l'égard du rayonnement ultraviolet, en milieu fluorescent (trypanosomes, bactéries, enzymes). [**Ultraviruses and Fluorescence. Behaviour of Trypanosomes, Bacteria and Enzymes Towards Ultra-Violet Rays, in a Fluorescent Medium**].—*Ibid.* 480-482. [1 ref.]

V. Levaditi, C., & Lominski, I. (1939). Ultravirus et fluorescence. Comportement à l'égard du rayonnement ultraviolet en milieu fluorescent (bactériophages). [**Ultraviruses and Fluorescence. Behaviour of Bacteriophages to Ultra-Violet Rays in a Fluorescent Medium**].—*Ibid.* 482-483. [1 ref.]

VI. Levaditi, C., Lominski, I., Reinié, L., & Le-Van-Sen. (1939). Ultravirus et fluorescence. Comportement des corpuscules élémentaires vaccinaux à l'égard du rayonnement ultraviolet en milieu fluorescent. [**Ultraviruses and Fluorescence. Reaction of Vaccinia Elementary Bodies to Ultra-Violet Rays in a Fluorescent Medium**].—*Ibid.* 483-486. [2 refs.]

VII. Levaditi, C., & Reinié, L. (1939). Ultravirus et fluorescence. Nombre de corpuscules élémentaires vaccinaux en relation avec les propriétés virulicides et agglutinantes des sérums antivaccinaux. [**Ultraviruses and Fluorescence. The Number of Elementary Bodies in Relation to the Neutralizing and Agglutinating Powers of Anti-Vaccinia Sera**].—*Ibid.* 916-919. 2 figs. [6 refs.]

I. The allantoic membranes of developing eggs infected with neuro-vaccine were removed at twenty-four hour intervals. Smears were examined in fluorescent light for elementary bodies, while the minimal infective dose was determined by intradermal inoculation of rabbits with serial dilutions. In the early stages a much higher proportion of E.B. was detected microscopically than by the *in vitro* test, whereas later the reverse obtained.

Eggs inoculated with normal brain tissue also showed large numbers of fluorescent bodies. L. suggests that the specific infective bodies seen in the early stages are " normal " but that as time elapses they are progressively replaced by specific E.B.

II. Normal and vaccine E.B. obtained as above were subjected to high speed centrifugation (about 29,000 r.p.m.). During the first twenty minutes the normal E.B. sedimented more rapidly. This suggests that they are slightly larger in size than vaccine E.B.

III. Suspensions of vaccine E.B., prepared from egg membranes and calf lymph respectively, were filtered through gradocol membranes of A.P.S. varying from 970 mμ to 330 mμ. The E.B. in the filtrate were counted and the number of virulent particles determined by intradermal inoculation of rabbits.

The adsorption of virulent elements was so great that infective filtrates were obtained only between the range of 970 mμ and 790 mμ. On the other hand fluorescent bodies passed through membranes down to 330 mμ.

IV. Various organisms and ferments were added to fluorescent substrates prepared by the addition of thioflavine. They were then subjected to ultra-violet irradiation (Å = 3,660λ) to determine the sterilization end point. Trypanosomes were destroyed in from $3\frac{1}{2}$-$4\frac{1}{2}$ minutes, whereas *Bact. coli communis* was still viable after 30 minutes. Trypsin and pancreatic juice were active after 120 minutes irradiation.

V. Various bacteriophages were acted on by ultra-violet light under conditions similar to those in IV. Their lytic powers slowly diminished but relatively long exposures (360 minutes) were necessary to produce an appreciable effect.

VI. Vaccine E.B. irradiated under similar conditions were relatively fragile and were inactivated in 15-30 minutes.

VII. The potency of rabbit anti-vaccinia serum was evaluated by determining the number of E.B. inactivated by a given amount of serum. The method permitted a rough titration of the sera. There was no apparent relationship between viricidal and agglutinating antibodies.—R. E. Glover.

Dalldorf, G. (1939). **The Simultaneous Occurrence of the Viruses of Canine Distemper and Lymphocytic Choriomeningitis. A Correction of " Canine Distemper in the Rhesus Monkey ".**—*J. exp. Med.* **70.** 19-27. 5 tables. [11 refs.]

A particular strain of canine distemper virus, long maintained by serial passage in dogs and ferrets was found to contain the virus of lymphocytic choriomeningitis in addition to that of distemper.

It is not known how lymphocytic choriomeningitis virus was introduced into the passage virus.

MELLANBY, E. (1938). **The Transmission of the Rous Filterable Agent to Chemically Induced Tumours.**—*J. Path. Bact.* **46.** 447-460. 4 figs. on 1 plate, 1 table. [8 refs.]

M. describes the methods employed in his experiments, including the preparation of the inocula and the criteria adopted, with differentiation between Rous and chemically-induced tumours. The birds used in the experiments received the chemically-induced tumours in the breast muscles and the Rous tumour in the leg muscles. From these chemically-induced tumours, growing in the same bird as a Rous tumour, cell-free and cell-containing inoculations were made into other birds. Further serial inoculations were made from these second generation tumours for a number of generations and histological slides were made in each generation. A number of typical experimental results obtained are described in detail with the aid of diagrams. Inoculation of cells from a chemically-induced tumour—tar or dibenzanthracene—from a bird which also carried a Rous tumour resulted in the production of a tumour similar to its parent, *i.e.* a chemically-induced tumour; on the other hand the inoculation of cell-free paper pulp filtrate resulted, if any tumour arose at all, in a Rous tumour. This indicated the passage of the Rous filtrable agent into the chemically-induced tumour with no apparent change in the latter. It was possible in two cases to show that the Rous sarcoma filtrable agent had passed into the second generation of chemically-induced tumours; cell-free filtrates of such tumours gave rise in the third generation to Rous tumours. Two other chemically-induced tumours regressed and were replaced by Rous tumours, again indicating the Rous agent in the second generation. The injection of Rous agent into a dibenzanthracene tumour does not cause its regression; it may cause the production of Rous tumour tissue within it.

These experiments do not support the view that there is a filtrable agent in the cancerous growths induced in fowls by dibenzanthracene or tar.—L. E. HUGHES.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

I. KNIPLING, E. F. (1938). **Internal Treatment of Animals with Phenothiazine to Prevent Development of Horn Fly** [*Haematobia irritans*] **Larvae in the Manure.**—*J. econ. Ent.* **31.** 315-316.

II. BRUCE, W. G. (1938). **A Practical Trap for the Control of Horn Flies on Cattle.**—*J. Kans. ent. Soc.* **11.** 88-93. 3 figs. [3 refs.]

I. In three cases phenothiazine administered to cattle in their food at the rate of 0·1 g. per kg. body weight, prevented development of *Lyperosia* (*Haematobia*) *irritans* larvae in the dung. The phenothiazine was fed daily for two months and no immediate harmful effects on the animals were noted.

II. A detailed account is given of the construction and operation of a relatively cheap trapping device which promises to control *Lyperosia* (*Haematobia*) *irritans* and to reduce the numbers of *Stomoxys calcitrans*. The number of *L. irritans* on cattle on a trapped pasture in Texas was reduced in two weeks by one half, as compared with control pastures; after the third week it ceased to be troublesome.—W. MOORE.

GOLDING, F. D. (1938). **Notes on Blood-Sucking Flies in Ilorin Province, Nigeria** [*Glossina*, **etc.**].—*Bull. ent. Res.* **29.** 215-218. 1 fig., 2 tables.

The writer surveyed the distribution of *Glossina* spp. in the Ilorin province for comparison with an earlier survey by MACFIE [(1913). *Bull. ent. Res.* **4.** 1].

The species found included *G. palpalis*, *G. tachinoides* and *G. morsitans* var. *submorsitans*.

In 1912, in 22 localities, *palpalis* was recorded in all, *tachinoides* in 9, and *morsitans* in 2. In 1937, in the same localities, *palpalis* was recorded in 21, *tachinoides* in 3, and *morsitans* in 1. MACFIE stated that the abundance of *palpalis* and *tachinoides* was approximately equal in the western division. In 1937 in the same region, 70 *Glossina* were collected, of which 66 were *palpalis* and 4 *tachinoides*. The alteration found in the proportions of the two species is not due to increased numbers of *palpalis*. Ecological changes due to the opening up of the country may have differentiated against *tachinoides*, the main change being reduced numbers of antelope.

Data are given on the incidence of other biting muscids and tabanids.—R. P. H.

MELLANBY, K. (1938). **Diapause and Metamorphosis of the Blowfly,** *Lucilia sericata* **Meig.**—*Parasitology*. **30.** 392-402. 1 fig. [14 refs.]

M. gives a review of diapause in *Lucilia sericata*. Unfavourable conditions during the larval or prepupal period cause diapause. Observations showed that diapausing prepupae contain more dry matter than normal individuals. Diapause can be terminated by enclosing prepupae in empty tubes. After desiccation, prepupae drink water, thus increasing the volume of blood which controls the size of the adult. It is suggested that diapause enables the species to survive unfavourable conditions in nature.—R. P. HOBSON.

I. SPICER, W. J., & DOVE, W. E. (1938). **The Screwworm and the Gulf Coast Tick in Southern Texas.**—*J. econ. Ent.* **31.** 642-646. 2 tables. [1 ref.]

II. BRENNAN, J. M. (1938). **The Incidence and Importance of** *Cochliomyia americana* **and Other Wound-Invading Species.**—*Ibid.* 646-649. 2 tables. [5 refs.]

III. CUSHING, E. C., & PARISH, H. E. (1938). **Seasonal Variations in the Abundance of** *Cochliomyia* **spp.,** *Phormia* **spp. and Other Flies in Menard County, Tex.**—*Ibid.* 764-769. 1 fig., 4 tables. [1 ref.]

IV. LAAKE, E. W., & SMITH, C. L. (1939). **The Development of Immunity in Cavies to the Larvae of** *Cochliomyia americana* **C. & P.**—*Ibid.* **32.** 339-342. [1 ref.]

V. BRODY, A. L. (1939). **Natural Foods of** *Cochliomyia americana*, **the True Screwworm.**—*Ibid.* 346-347. 1 table.

I. In the Gulf Coast district of Texas over 50 % of screw-worm cases during the period July to October occurred in bites made by the tick *Amblyomma maculatum*. Intensive control of the tick is needed for the reduction of screw-worm cases in this area and to reduce the opportunity of shipping screw-worm infested animals from the Gulf Coast area into distant territories.

II. The screw-worm problem in the United States is essentially one of controlling *Cochliomyia americana* because it is responsible for 86 % of recorded infestations. *Phormia regina* is the most important of the secondary species and is responsible for 8 % of the infestations recorded. There is a danger of the spread of *C. americana* through the movement of infested animals.

III. In Menard County, Tex., records obtained over four years show that *Phormia* spp. are the predominant species of flies from November to April and *Cochliomyia* spp. from May to November. *Cochliomyia* spp. have four main peaks of comparative abundance namely May 10th to 20th, July 9th to 19th, September 7th to 17th, October 17th to November 6th. Few cases of screw-worm infestation occur prior to May 10th, so that all operations such as shearing, marking, castrating

and dehorning should be completed by then, and animals bred so that the young will be born before this date or between the peak periods of comparative abundance.

IV. The number of *Cochliomyia americana* larvae constituting a maximum sublethal and a minimum lethal initial infestation in the average g. pig was found to be two and three respectively per hectogram of body weight. An immunity or enhanced tolerance in g. pigs to *C. americana* larvae is developed from an initial maximum sublethal infestation, the amount varying from 50-100% greater than that of uninfested animals.

V. The natural food of adult flies of *Cochliomyia americana* appears to be fresh fruit juices containing sugars. Adult flies fed on animal products alone, such as dung, wound fluid and carcass meat, died before oviposition.—W. Moore.

Parker, R. R., Kohls, G. M., Cox, G. W., & Davis, G. E. (1939). **Observations on an Infectious Agent from** *Amblyomma maculatum.*—*Publ. Hlth Rep., Wash.* **54.** 1482-1484. [Authors' summary copied *verbatim*].

A rickettsia-like infectious agent mildly pathogenic for guinea pigs has been recovered from *Amblyomma maculatum* collected near Cleveland, Texas. As observed in male guinea pigs, there is usually a characteristic temperature curve and oedema and reddening of the scrotum, but infection is sometimes inapparent. There is complete cross immunity between this infection and both Rocky Mountain spotted fever and boutonneuse fever, but with endemic typhus the degree of cross immunity is less consistent. However, it agrees with none of these diseases in all particulars.

Hixson, H. (1939). **Biology, Host Relationship and Identification of Ticks Infesting Dogs in Florida.**—*N. Amer. Vet.* **20.** No. 7. 45-50. 5 figs.

There are five species of ticks which are parasitic on dogs in Florida, namely *Rhipicephalus sanguineus* which is found throughout the year, *Ixodes ricinus scapularis* found only in the winter months, *Dermacentor variabilis* in spring and early summer, and *Amblyomma americanum* and *A. maculatum* in the summer. All the stages of *R. sanguineus* attack canine hosts, while only the adult stage of the other four species is found on dogs.—W. Moore.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Chatterji, R. C. (1938). **Annotated List of the Helminths Recorded from Domesticated Animals of Burma. Part I.—Trematoda.**—*Proc. nat. Acad. Sci. Ind.* **8.** 93-104. 1 fig. [Numerous refs.]

This is a description of trematodes comprising :– *Fasciola gigantica* in cattle and buffaloes, *F. jacksoni* in elephants, *F. buski* in pigs, *Eurytrema pancreaticum* in cattle, *Prosthogonimus* spp. in fowls, *Echinostoma revolutum* in ducks, *Paryphostomum sufrartyfex* in pigs, *Catatropis verrucosa* in ducks, *Schistosoma bovis* in cattle, *Paramphistomum birmiense* in cattle, *P. cervi* in cattle and goats, *P. explanatum* in cattle and buffaloes, *P. microon* in cattle and buffaloes, *P. orthocoelium* in cattle, *Cotylophoron cotylophorum* in cattle, buffaloes, goats and sheep, *Gastrothylax crumenifer* in cattle, buffaloes and goats, *Fischoederius elongatus* in cattle, *Pseudodiscus collinsi* in elephants, *Hawkesius hawkesi* in elephants, *Pfenderius papillatus* in elephants, *Gastrodiscus secundus* in horses, *Gastrodiscoides hominis* in pigs, and *Homalogaster paloniae* in cattle.

CARTA, A. (1939). Ancora sulle alterazioni delle linfoghiandole portali nella distomatosi epatica. [**Changes in Portal Lymph Nodes in Hepatic Distomatosis**].—*Nuovo Ercol.* **44.** 97-104. [Numerous refs.]

This paper determines the nature of the yellow coloration found in the reticular cells of the portal lymph nodes, in hepatic distomatosis. Chemical and spectroscopic examinations endorse the author's previously published opinion, that these are derived from bile pigments. A discussion is given on the origin of the hyperplasia of fibro-muscular cells in the capsule and trabeculae of these glands. —KATHARINE SANDERSON.

JOYEUX, C., & BAER, J. G. (1937). Remarques morphologiques et biologiques sur quelques cestodes de la famille des Taeniidae Ludwig. [**Morphological and Biological Observations on some Cestodes of the Family Taeniidae Ludwig**].—*Papers on Helminthology, commemorating 30 year Jubilee of Prof. K. I. Skrjabin.* pp. 269-274. Moscow: Lenin Acad. Agric. Sci. 1 fig., 1 table. [5 refs.] [In French: Russian summary].

The cestodes of the genus *Taenia* present numerous adult forms which are very similar and very difficult to distinguish from each other. The authors believe that *T. laticollis*, which is found in the lynx, can be distinguished from *T. taeniaeformis* by the absence of a vaginal sphincter in the former's mature segments. The hooks are perhaps a little shorter in *T. laticollis* and the eggs slightly smaller. The latter parasite was found in a genet in France by the authors. Though the adult taenias often closely resemble one another, there are great morphological differences in their larvae. In this connexion, the larvae of *Cladotaenia cylindracea*, *T. polyacantha*, *T. pisiformis*, *T. crassiceps* and *E. granulosus* are mentioned. The presence of *T. solium* and *T. saginata* in man raises an interesting problem in phylogenetics. Their adaptation to man could not have taken place till man adopted a carnivorous mode of feeding, and unfortunately this exact period is very difficult to ascertain with certainty.—A. L. WILSON.

ALICATA, J. E., & CHANG, Ellen. (1939). **The Life History of *Hymenolepis exigua*, a Cestode of Poultry in Hawaii.**—*J. Parasit.* **25.** 121-127. 13 figs., 1 table. [6 refs.]

Amphipods (*Orchestia platensis*) were allowed to ingest the uterine sacs containing eggs of the tapeworm collected from the droppings of the chicks. In about 12 days the eggs developed to the cysticercoid stage. When fed to week-old laboratory-raised chicks the cysticercoids reached maturity in the duodenum and eggs were demonstrated in the droppings 9-10 days after the experimental infection.

Other invertebrates such as sow-bugs (*Porcellio laevis*), beetles, house-flies and earth-worms were allowed to feed on the eggs, but in none was infection set up. Evaginated cysticercoids produced no infection in chicks. A description of the adult worm is also given.—S. G. IYER.

DAVEY, D. G. (1938). **The Respiration of Nematodes of the Alimentary Tract.** —*J. exp. Biol.* **15.** 217-224.

The author investigated the dependence on oxygen of some nematodes parasitic in the alimentary tract of sheep, and his findings are as follows. Prolonged anaerobiosis of from 24-48 hours kills *Ostertagia circumcincta*, *Trichostrongylus colubriformis*, *T. vitrinus*, *Cooperia curticei*, *C. oncophora* and *Nematodirus filicollis*. It is also fatal to *Ascaris*. The nematodes from the sheep succumbed even when the medium around them was constantly changing and percolating over them so that any by-products of their metabolism which may have permeated their cuticle

were constantly being removed. The parasites were kept in Ringer's solution and the oxygen-free atmosphere was obtained with a Macintosh and Fildes jar. Controls lived for from 4-12 days when kept in Ringer's solution exposed to the air.—A. L. Wilson.

Ryksen, W. J. (1939). **The Occurrence and Pathogenicity of *Nematodirus* Species in Arid Areas.**—*J. S. Afr. vet. med. Ass.* **10.** 29-31. [1 ref.]

After describing the vegetation, climatic conditions and pasturage of certain arid areas of South Africa in the Great Karroo, the author mentions that the only nematode commonly found in sheep in those areas is *Nematodirus*. The larvae of this worm are able to survive on account of their resistance to desiccation and their strong negative geotropism. Infestation is seen most commonly in sheep watered from open dams or " vleis " and severe losses may occur when sheep are collected in small camps during times of drought and are overcrowded.—E. M. R.

Heydon, G. A. M., & Bearup, A. J. (1939). **A Further Case of Human Infection With Trichostrongylus Colubriformis in New South Wales.**—*Med. J. Aust.* May 6th. 694-695. [8 refs.]

Eggs resembling those of *Trichostrongylus* spp. were present in the faeces of a child of four years of age. Larvae obtained by culturing faeces were fed to a rabbit, and at autopsy forty-seven days later one male and four female *T. colubriformis* were found. It is thought that the infection was acquired from goats.
—H. McL. Gordon.

Augustine, D. L., & Davey, D. G. (1939). **Observations on a Natural Infection with *Strongyloides* in the Dog.**—*J. Parasit.* **25.** 117-119. [5 refs.]

The authors believe this to be the first recorded case of natural strongyloides infection of the dog outside the Orient (one case in China and one case in India). It was found in a 5-weeks-old hound puppy without previous history. Numerous *Ancylostoma caninum*, *Toxocara canis* and *Trichuris vulpis* eggs, and rich filariform strongyloides larvae cultures were obtained from the faeces from March to April 1938. An experimental increase of infection was attempted by applying 2,000 infective larvae from cultures of the faeces of the dog to the inguinal region on May 5th, but no such increase occurred and on May 18th a rapid decrease was noted. On May 31st 3,000 infective larvae obtained from an experimentally infected dog were applied. All later tests for strongyloides larvae being negative, the dog was destroyed on June 28th. No evidence (histological examination and Baermann extraction of lungs, trachea, gall-bladder and intestines) of strongyloides was found.

Old and young dogs could be readily infected cutaneously, but large numbers of larvae failed to infect g. pigs, two young cats and monkeys (*Macaca mulatta*). An adult human volunteer remained free after the application of 20 infective larvae. From the above results the authors suggest that the worm found was *Strongyloides canis* Brumpt, 1922.—C. V. Watkins.

Clapham, Phyllis A. (1939). **On Flies as Intermediate Hosts of *Syngamus trachea*.** —*J. Helminth.* **17.** 61-64. [7 refs.] [See also *V. B.* **9.** 720 and **4.** 751].

It has been demonstrated by experiments, involving female flies of *Musca domestica* and *Lucilia sericata* as intermediaries, that some flies, both in their larval and imaginal states, may act as invertebrate hosts for *S.t.* The physiological difference between *S.t.* from chickens and starlings is discussed. While it is difficult to infect chickens with worms of starling origin by direct passage, parasitism

occurs readily if an earth-worm is available as intermediate host, as by this means the resistance due to a different " host strain " may be overcome.—S. G. Iyer.

Brown, H. W. (1939). **Observations on the Dog Heartworm, Dirofilaria Immitis.** —*N. Amer. Vet.* **20.** No. 1. 49-55. 2 tables. [7 refs.]

Examination of 186 adult dogs from Savannah, Georgia, showed that 33·7 % were infected with *Dirofilaria immitis*. Of 27 immature dogs from the same locality only 7·2 % were infected. Of 32 dogs from Orange County, North Carolina, 40·6 % proved to be infected, while 4 out of 6 dogs from Hopkins County, Kentucky, harboured the parasites. Twenty cats from Savannah were also examined, but none was infected.

The infection rate between male and female dogs was approximately equal, as was that between long and short haired animals. The incidence among rural dogs, however, was approximately twice that of urban dogs.

Eight out of ten fleas from a dog showing 10 microfilariae per low-power field harboured microfilariae. It is suggested therefore, that fleas may play an important role in the transmission of the parasite.—D. D. Ogilvie.

IMMUNITY

Hungerford, T. G. (1939). **The Double Intradermal Tuberculin Test.**—*Aust. vet. J.* **15.** 15-18.

The author records his observations after experience in approximately 10,000 tests carried out under widely different circumstances and describes his technique for performing the double intradermal tuberculin test in the caudal fold of cattle.

The animals should be disturbed as little as possible, the tail not raised and the tuberculin injected forcibly. It is suggested that a dose of 0·2-0·25 ml. is highly desirable.

The reading of the reactions is based upon :– (1) the amount of swelling ; (2) the presence of oedema, and (3) the presence of a " sebaceous " condition of the skin.

Some infected animals give little increase in skin thickness, but a peculiar greasy condition of the skin over the site of injection may be considered of diagnostic value.—H. B. Carter.

I. Bonnet, H., Thieffry, S., & Montefiore. (1938). Caractères et évolution des réactions tuberculiniques au cours de l'infection expérimentale par le bacille tuberculeux aviaire. **[Tuberculin Tests in Experimental Infection with the Avian Tubercle Bacillus].**—*C. R. Soc. Biol. Paris.* **128.** 585-589. [2 refs.]

II. Bonnet, H., Thieffry, S., & Montefiore. (1938). Réactions tuberculiniques au cours de l'infection expérimentale réalisée avec le bacille tuberculeux aviaire. **[Tuberculin Tests in Experimental Infection with the Avian Tubercle Bacillus].**—*Ibid.* 725-726. [1 ref.]

I. Detailed description is given of a study of reactions to avian and bovine tuberculin in fowls, rabbits and g. pigs previously inoculated with virulent tubercle bacilli of one human and six avian strains. Weekly records were kept of reactions to intradermal tuberculin tests, from which the development of allergy and of intensity of reaction were studied.

In fowls the development of allergy did not depend on the dose of virulent avian bacilli previously inoculated. In g. pigs inoculated with human bacilli the

rapidity of onset of allergy was proportionate to the dose of bacilli inoculated. The rate of development, and its persistence and disappearance in the test animals is discussed.

II. The character of the reaction to bovine tuberculin by animals infected with avian tubercle bacilli is studied. In fowls the pre-allergic period was longer than to avian tuberculin. The variation in intensity, in persistence and in rate of disappearance of allergy to the two tuberculins is demonstrated. In fowls, g. pigs and rabbits infected with avian tubercle bacilli, sensitivity to bovine tuberculin appeared more slowly, was shorter in duration, less regular in intensity and disappeared at a much earlier period than reaction to avian tuberculin.—H. Burrow.

Frappier, A., & Fredette, V. (1939). Comparison de deux méthodes d'appréciation de la sensibilité dermique à la tuberculine : celle de la recherche de la dose réactionelle minimum et celle de l'évaluation de l'intensité des réactions à une dose forte, chez le cobaye. [**Comparison of Methods for the Evaluation of the Tuberculin Test**].—*C. R. Soc. Biol. Paris.* **131.** 491-494. 2 tables. [3 refs.]

A comparison is made of two methods of titrating the sensibility of g. pigs to intradermal injection of tuberculin, by recording the intensity of reaction to single massive doses of tuberculin, and by the determination of the minimal reactive dose of tuberculin, this being established by making intradermal injections of decreasing doses of tuberculin and finding the exact one below which reaction did not occur. This second method was applied to groups of g. pigs so as to give a result which could be regarded as an average.

Wide discrepancies were noted in the results given by the two methods. It is concluded that, as a means of studying the evolution of sensibility to tuberculin, the estimation of the minimum reactive dose of tuberculin is a more rational procedure than that of estimating the maximum intensity of reaction to a single massive dose.—H. Burrow.

Dory, J. (1937). Nachweis von Helmintheninvasionen mit Hilfe serologischer Methoden unter besonderer Berücksichtigung der Präzipitation bei Trichinose. [**Demonstration of Helminth Invasions by Serological Methods with Special Reference to Precipitation in Trichinosis**].—*Inaug. Diss., Hanover.* pp. 37. 4 tables. [Numerous refs.]

Three antigens, the methods of preparation of which are given, were used to examine the sera of pigs, rabbits and g. pigs. None of the three was of any value, all giving false positives and false negatives.—P. S. Watts.

Heidelberger, M. (1939). **Quantitative Absolute Methods in the Study of Antigen-Antibody Reactions.**—*Bact. Revs.* **3.** 49-95. 3 figs., 3 tables. [Numerous refs.]

The interactions between antigen and antibody were at one time considered to be chemical and later to be adsorption phenomena. In recent years the adsorption process has been regarded as chemical rather than physical, thereby breaking down the old distinction. Antibodies are now regarded as modified serum globulins, and modern theories of antigen-antibody reactions depend on an understanding of the nature of the substances involved and their quantitative relationship.

Many studies have involved the use as " antigen " of the specific polysaccharide of Type III pneumococcus, the salt of a nitrogen-free polyaldobionic acid, and the use as " antibody " of partly purified antibody in the form of solutions of

Type III antipneumococcus horse serum. Since the polysaccharide contains no N the difference between the original N content of the solution and that remaining after the centrifugation of a precipitate formed by the antigen-antibody complex, gives an accurate measure of the amount of antibody precipitated, in absolute not in relative terms. Although it is assumed that the antigen and antibody are chemically and immunologically multivalent the antibody may be treated as if its average behaviour were that of a single substance. For purposes of calculation the antigen-antibody reactions may be considered as a series of bimolecular reactions before precipitation occurs, and the rates of formation of the reaction products as proportional to the concentrations of the reacting substances. To convert units of antigen and antibody into milligrams, one unit of antibody N may be said to consist of 1 mg. By plotting the results of experiments graphically, it has been shown that a linear relationship exists and it is possible thereby to characterize an unknown Type III antipneumococcus serum by two or three analyses in duplicate.

Extension of these studies to protein-antiprotein systems involves the distinction between antigen-nitrogen and antibody-nitrogen. This is overcome by using a red-protein dye in the antigen and the specific precipitates are estimated colorimetrically. After the total N is estimated the amount of antibody-nitrogen can then be calculated.

The quantitative precipitin technique is therefore an accurate method for the determination of minute quantities of specific carbohydrates and of proteins.

Specific bacterial agglutination differs from specific precipitation only in that the former reaction takes place on particulate matter. The technique described can be modified for agglutination and a measured amount of thoroughly washed killed pneumococcus suspension is then analysed for nitrogen. This value may be deducted from the nitrogen found after the same volume of cell suspension has been agglutinated by an accurately measured volume of serum and washed free from non-specific protein. The result gives the agglutinin content of the serum in absolute terms and it depends on the relative proportions in which the components are mixed.

These studies reveal the differences between antipneumococcal sera produced in the horse and that in the rabbit and have a practical bearing on the treatment of pneumonia. They also support the theory that specific bacterial agglutination is a dynamic process of the chemical combination of multivalent antigen and multivalent antibody which builds up larger and larger aggregates till these flock out ; the salts merely minimize the electrostatic effects which might interfere with the process of building up aggregates.

As far as lipids are concerned, their function in promoting specific precipitation and agglutination is a mechanical one providing nuclei for the formation of aggregates.

The whole review is an attempt to discuss the newer data obtained by quantitative methods conforming to the criteria of analytical chemistry.—R. Lovell.

Panisset, L., & Dauvois, L. (1939). A propos de la résistance acquise non spécifique (para immunité) dans les maladies à ultra-virus : vaccination anticharbonneuse et fièvre aphteuse. [**Non-Specific Resistance (Para-Immunity) in Virus Diseases : Anti-Anthrax Vaccination and Foot and Mouth Disease**].—*C. R. Soc. Biol. Paris.* 131. 565-566. [2 refs.]

When F. & M. disease appeared in an area where annual vaccination against anthrax was carried out, it had a tendency to disappear earlier than in unvaccinated areas. The F. & M. disease which developed was as severe in the vaccinated animals as in those not vaccinated.

It is concluded that in bovines and sheep anti-anthrax vaccination during the period when immunity continues seems not to confer any immunity against F. & M. disease.—F. H. Manley.

Fairley, N. Hamilton. (1938). **Discussion on Immunity to Animal Parasites. Metazoal Immunity.**—*Proc. R. Soc. Med.* **31.** 1291-1298. [Numerous refs.]

Animals show both natural and acquired immunity to helminth infestation. The presence of invading helminths or their products causes a cellulo-humoral reaction which is typified by the occurrence of leucocytes, including eosinophiles, round cells, macrophages and foreign-body giant cells.

Parenteral injection of helminth extracts may result in the appearance of antibody and sometimes confers a certain degree of resistance to infection.

When injected into a susceptible host, sera from infected animals occasionally give a variable degree of protection, but this has not been identified with precipitin or complement-fixing antibody. The so-called " protective antibodies " often seem to affect the immature rather than the adult parasite, acting as " growth-inhibiting " substances and leading to abnormal development and inhibition of reproduction.

Natural Immunity.—Little is known of the mechanism of natural immunity. Invasion may be prevented by mucoid secretions of the host, the concentration of hydrochloric acid in the stomach or the digestive properties of the intestinal juice. After invasion, the following inimical factors may operate :- cellular reactions, unsuitability of the host tissue as a pabulum, the presence of growth-inhibiting substances or natural protective antibodies in the body fluids.

Acquired Immunity.—Acquired immunity following infection may be local or general and various examples of each type are cited.

Antibody Response and Laboratory Diagnosis.—Exclusively intestinal helminths do not give rise to precipitin or to c.-f. antibody, but eosinophilia and dermal sensitivity to parasitic extracts may develop. In somatic helminthiasis, circulating antibody has often been demonstrated. For diagnosis, complement-fixation reactions have proved more successful than precipitin tests. Examples are given showing the value of these methods in the investigation of echinococcosis, schistosomiasis, filariasis and trichinosis.

Intradermal tests reveal hypersensitiveness to helminthic extracts or cyst fluid and both immediate and delayed reactions may follow their injection.

Allergic Phenomena.—Brief mention is made of the allergic phenomena which may develop in animals infested with helminths or with the larvae of certain warble flies.—R. P. Hobson.

Curasson, G. (1938). Sur le choix et la préparation des saponines pour l'obtention des vaccins saponinés. **[The Choice of Saponins for Making Saponin Vaccines].**—*Bull. Acad. vét. Fr.* **9.** 79-83. [2 refs.]

C. discusses various theories put forward as to the mechanism of the immunity conferred by saponin vaccines and the part played by the saponin. Too great a concentration of saponin will lead to local necrosis, but this can be avoided by using a dilution varying between 1:50 and 1:100 according to the saponin used.

Weak or negative reactions after vaccination may be due to weak haemolytic power or to hydrolysis of the saponin. As saponins differ widely in haemolytic power, the haemolytic index must be found for every lot of saponin used, a method for which is described. The haemolytic power can be destroyed by cholesterin, by some sugars, by amino acids and by alkalis ; this is avoidable by using a physiological saline solution buffered to pH 7·4.

Hydrolysis of the saponin may be brought about by dilute mineral acids or by certain specific enzymes, giving rise to a carbohydrate and to sapogenin which has little or no physiological activity. This may be avoided by heating to 90°C. Saponins employed should be pure, dry, of known haemolytic power and of known vegetable origin, and the loss of haemolytic power prevented by the above precautions. Finally the diluted saponin should be tested before use by sugar reactions (showing absence of hydrolysis) and by the " fish index " (survival time of fish of known weight in solutions of given strength).

REICHEL, J. (1939). **Anaphylaxis as Related to Biologic Prophylaxis and Treatment of Animals.**—*J. Amer. vet. med. Ass.* **94.** 418-420. Discussion p. 442. [3 refs.]

Anaphylactic shock may follow the second injection of a foreign protein after an appropriate interval; on the other hand, some animals are already naturally sensitized to a foreign protein. Why this latter phenomenon occurs, or in what percentage of animals it is met with is not known. Sometimes it follows the administration of a foreign serum, as for example horse serum in the form of anti-anthrax serum in the vaccine-serum anthrax treatment for cattle. Sometimes even the use of homologous serum is not sufficient to avoid the development of anaphylaxis. It is stated that it is becoming increasingly clear that changes occur in a serum heated to about 58°C. for thirty minutes with the addition of a phenol preservative and that its use is more apt to be followed by the train of anaphylactic symptoms than the use of serum not so altered by heat. It is therefore considered to be better to preserve serum without heat. In connexion with the accidental transmission of virus infections by antisera it is observed that the ageing of serum for about 30 days with a phenol preservative will destroy the infectivity of a serum containing the virus of equine infectious anaemia.

Sensitized animals can be shown to be sensitive by dropping a 1:10 dilution in the eye or by the injection of such a dilution intradermally.

During a discussion on this paper it was stated that the use of adrenalin is useful in treatment to prevent anaphylaxis and one member who had had trouble with the serum treatment of pigs mixes the adrenalin, apparently in doses of 0·5 c.c., with the serum. He had had no bad results since adopting that procedure.

—R. LOVELL.

DISEASES, GENERAL

MANNINGER, R. (1939). **The Extent of Bovine Tuberculosis and of Brucellosis in Hungary and the Organisation of Control Measures.**—*Mon. Bull. agric. Sci.* **30.** 134T-138T. 3 tables.

This article is largely based upon the statistics of Budapest abattoirs. Some decades ago the steppe breed of Hungarian cattle was almost free from TB., except for the stall-fed steers. Since 1900 stall feeding has become as prevalent for cows of this breed as for the breeding stock of coloured cattle, especially Alpine breeds. With this change in husbandry the amount of TB. gradually increased up to 1905 and has since remained fairly constant. Fluctuations in the amount of the disease from year to year are tabulated and are probably referable to changes in the average age of cattle slaughtered, disease incidence varying from about 1 % at one year old to about 40 % at over 9 years. In about 130,000 calves slaughtered annually (1929-1938) the incidence was from 0·06-0·1 %. Actual loss could not be estimated from the statistics as the extent of condemnation is not analysed, but the figures

suggest a lower incidence of tuberculosis in Hungary than in a number of other countries.

The Bang method of control was introduced before the war of 1914-1918, but was abandoned for economic reasons ; it was reintroduced in 1930. Although not compulsory it receives State support. The number of cattle examined and declared free from TB. has gradually increased to 10,891 (108 out of 124 herds) in 1938.

The public health aspects of bovine TB. (stringent laws relating to meat inspection, compulsory slaughter of open cases of TB., the law against selling for human consumption milk from cows with mammary tuberculosis and the pasteurization of milk from animals affected with all other forms of bovine tuberculosis) are briefly noted.

No state control of brucellosis exists. Since 1930 no anti-brucellosis vaccine has been issued and all control measures are essentially hygienic in character. —C. V. WATKINS.

GALLI-VALERIO, B. (1939). Observations sur quelques maladies parasitaires et sur quelques intoxications des animaux domestiques et sauvages. [**Parasitic Diseases and some Cases of Poisoning in Domestic and Wild Animals**].—*Schweiz. Arch. Tierheilk.* **81.** 91-108. 1 fig. [2 refs.] [In French].

This paper describes over forty laboratory examinations and diagnoses, the material being drawn from a wide range of domestic and wild animals, including birds, fish etc. The causes also vary widely and include bacteria, helminths, external parasites, poisons and foreign bodies.—S. J. GILBERT.

KELLER, K. (1938). Kontraselektion. [**Contraselection**].—*Dtsch. tierärztl. Wschr.* **46.** 753-755.

K. first discusses some faults in animal breeding. Sufficient care is not taken to exclude from the breeding stud animals carrying recessive lethal characters. Monorchids are usually potent and are occasionally used for stud purposes ; this is most undesirable and probably accounts for the very high incidence of the condition in some studs. In cases of spavin or ringbone apparently following severe strain, sufficient attention is not paid to the inherited predisposition without which the exostosis would not have developed. Another example of faulty breeding is seen in the deliberate perpetuation of sub-lethal inherited factors or of characters coupled with them. Another fault consists in excessive emphasis being placed on the value of one particular character with an almost total disregard for other important characters ; examples are cows of heavy milking strains and hens of very high egg-laying capacity.

In attempting to breed animals for such special purposes certain undesirable features often appear ; this phenomenon is spoken of by K. as contraselection. The frequency of metabolic and deficiency diseases to-day is probably in part explained in this way as is also the high incidence of tuberculosis in cattle. An increased susceptibility to disease has occurred in the course of the breeder's attempts to accentuate particular desirable characters. One of the most serious examples is seen in the high incidence of sterility in cattle and horses. The unrestricted use of aphrodisiacs and hormone preparations should be discouraged as being likely to result in time in an increased incidence of this disease. The problem should be dealt with preferably on the lines of genetics, all animals with undesirable characteristics and their progeny being excluded from breeding stock. In addition, it would be advisable to exclude also all animals which required special treatment for the development of fertility.—E. G. WHITE.

Götze, R. (1939). Störungen der Fortpflanzung. [**Diseases of Breeding Animals**].—*Rep. 13th int. vet. Congr. 1938.* **1.** 193-213. [In German : English, French and Italian summaries. Discussion in French and German pp. 239-241].

It is estimated that 1½ to 2 million animals are examined and treated each year in Germany by veterinarians for disorders of reproduction. The importance of this branch of animal disease treatment would seem to warrant the establishment of official centres, the function of which would be to give advice to stockbreeders on methods of prevention and control. Particular attention should be paid to environmental factors which act unfavourably ; heredity is probably only of secondary importance.

Attempts to improve the environment should be directed into four main channels—breeding, management and feeding, specific infections, and sporadic diseases. Better farming methods with adequate manuring of the land would be of considerable help in producing food material rich in the essential minerals and vitamins. Artificial supplements of these substances do not always have the desired effect, since our knowledge of the normal requirements is still far from complete. A number of sporadic disease conditions are due to faulty hygiene at the time of and subsequent to parturition.

The prevention of diseases of reproduction and the improvement of fertility in farm animals are perhaps the most important functions of the veterinarian. The regular examination of all animals used for breeding and the use of active prophylactic measures are essential if this campaign is to be successful.

During the discussion on this paper, Stäheli recorded the successful use of follicular hormone (" Provetan ") in the treatment of pyometra in cattle ; in 43 of 61 cases hormone treatment resulted in evacuation of the uterine discharge, followed by oestrus. One (occasionally two) subcutaneous injection of 30-50,000 mouse units was the dose used. An advantage claimed over expression of the corpus luteum is the possibility of haemorrhage when the latter method is used. —E. G. White.

Schlotthauer, C. F. (1939). **Some Causes of Sterility in Cows.**—*J. Amer. vet. med. Ass.* **95.** 33-37. [2 refs.]

Cervicitis is the most frequent specific lesion of the genital tract of sterile cows. It may be present alone or associated with vaginitis, metritis or salpingitis. Unilateral salpingitis and endometritis are next in frequency of occurrence.

The diagnosis of the cause of sterility is based on the breeding record of the herd, and on a clinical examination of the individual cow.

Primary cervicitis is treated by irrigation of the cervix and uterus with a watery iodine solution and by amputation of all protruding and inflamed cervical folds. Endometritis, likewise, yields to iodine solution. The cure is hastened by ample exercise and a vitamin-rich diet. Pyometritis, however, is sometimes persistent and it is necessary in such cases to express a functioning corpus luteum in order to obtain spontaneous contraction of the uterus.—D. D. Ogilvie.

Oppermann, T. (1939). Schlusswort zur Frage des Virusabortus der Stuten. [**Reply to the Question of Virus Abortion in Mares**].—*Z. InfektKr. Haustiere.* **55.** 180-182. [5 refs.]

In continuation of the controversy with Miessner [*V. B.* **9.** 792.], O. further discusses the evidence of the case and asserts that the true cause of the abortions under discussion might equally as well have been nutritional as infectious, and that in any case further research is necessary. M.'s omission to cause abortion in mares by his " virus " is remarked upon.—J. E.

Lalas, B. (1939). Untersuchungen an makroskopisch nicht veränderten Eierstöcken nymphomaner Stuten. **[Examination of the Unaltered Ovaries of Nymphomaniac Mares].**—*Wien. tierärztl. Mschr.* **26.** 387-395. [Num. refs.]

During the last 10 years at the Veterinary High School in Vienna ovariotomy has been performed on 100 mares showing symptoms of nymphomania. In 15 cases the ovaries were free from macroscopic cysts visible from the external surface. These ovaries were examined by a series of sagittal sections and details of five representative pairs of ovaries are given. No histological examination was made.

Following the operation, eight animals were reported to have returned to normal, four remained intractable, and no report was obtainable on the remaining two cases. In the eight successful cases sagittal sections of the ovaries showed numerous cysts, not visible from the exterior. In the remaining ovaries there were usually no abnormal cysts.—E. G. White.

Prat, J. (1939). Gangrène gazeuse d'origine génitale chez la vache en état de gestation. Avortement consecutif. (Guérison par le serum antigangréneux). **[Gas Gangrene of Genital Origin in a Pregnant Cow, with Subsequent Abortion].**—*Rev. Méd. vét., Toulouse.* **91.** 305-313.

Two cases clinically diagnosed as gas gangrene of the genital tract, resulting in abortion are discussed ; " gas gangrene serum " was used for treatment in one case.—F. H. Manley.

DeVita, J. (1939). **Hyperplastic Endometritis or So-Called Pyometra of the Bitch : Preliminary Report.**—*J. Amer. vet. med. Ass.* **95.** 50-58. 5 figs.

Hyperplastic endometritis is a uterine disease the origin of which coincides with changes in the ovary and apparent endocrine dysfunction. The condition is most frequently observed in bitches over six years old, and is associated with well defined neuropsychic and physical aberrations.

In most cases either cystic follicles or neoplasms can be demonstrated in the ovaries. In the more acute phases of the disease fresh corpora lutea are always present, but in chronic types retrogressive changes predominate.

The condition of the uterus varies with the phase of the oestral cycle. Organs removed at anoestrus may not be much larger than normal, but those examined in early metoestrus show great proliferative changes. The height of development is attained at a time corresponding to normal parturition. In chronic cases fibrosis is usual, and in older animals tumour formation is a frequent sequel.

Histologically, the endometrium in acute cases exhibits a complex glandular hyperplasia in which leucocytosis, hyperaemia, oedema, and various retrogressive changes predominate. In many cases abscess formation, infarction, and necrosis are also present. Bacteriologically, only organisms which normally constitute the flora of the vaginal mucosa have been demonstrated in the discharge.—D. D. O.

Langham, R., & Hallman, E. T. (1939). **The Bovine Kidney in Health and Disease.**—*J. Amer. vet. med. Ass.* **95.** 22-32. 24 figs., 1 table. [11 refs.]

A general description of the anatomy, histology and physiology of the normal bovine kidney is given. This is followed by a discussion of the pathological changes in kidneys obtained from 24 animals which had been maintained on low magnesium diets. Considerable damage in varying degree was found, but in the majority of cases the lesions were of a subacute or chronic nature. Degenerative changes appeared to originate in the smaller branches of the renal artery, being present mainly in the tunica media, although proliferation with thickening of the tunica intima was seen. Atrophy of the tubules, often to an extreme degree, was

a conspicuous feature, as were also productive and cellular infiltrative processes in the intertubular tissues of the cortex with subsequent cicatrization. Other changes found were cloudy swelling and vacuolar degeneration, and calcification of the epithelium of the tubules in the more advanced cases. The glomeruli, as a rule, appeared to be but slightly affected.

The direct cause of the lesions is not known but the fibrosis is supposed to result from the diminished blood supply, and reference is made to suspicions of a toxic factor.—J. R. Lawson.

Weiss, H. (1939). Beitrag zur Aetiologie und Therapie der Azetonurie der Rinder. [**Aetiology and Therapy of Acetonuria in Cattle**].—*Tierärztl. Rdsch.* **45.** 30-34. [17 refs.]

A general discussion of the nature and cause of acetonuria, without any experimental evidence to support the theories put forward.—V. Chládek (Prague).

Aschmoneit, Eleonore. (1937). Ueber die Veränderungen der Regio occipitalis, der Regio temporalis und Regio parietalis des Pferdes bei der Hydrocephalia chronica interna acquisita. Zugleich Beitrag zur cytoarchitektonischen Gliederung dieser Grosshinabschnitte beim Pferde. [**Changes in Occipital, Temporal and Parietal Areas in Horses with Acquired Chronic Internal Hydrocephalus**].—*Inaug. Diss., Berlin.* pp. 32. 3 figs., 5 tables. [Numerous refs.]

The material used for this study was the same as that described by Haase-Wranau [*V.B.* **6.** 609.], Schecker [*Ibid.*] and Mross [*V. B.* **5.** 284]. In each article the cytology of various regions of the cerebral cortex was studied in two normal horses and in three affected with acquired internal hydrocephalus.

The boundaries of the three regions examined by A. were not well defined. The most marked changes in hydrocephalus were found in the area striata and in the inferior part of the temporal region; they comprised destruction of ganglion cells and degenerative and proliferative changes in the neuroglia.

A characteristic feature of chronic acquired hydrocephalus in the horse is the effect of increased pressure which results in a backward displacement into the cerebellar cavity of part of the cerebral cortex in the occipital pole beneath the tentorium cerebelli.—E. G. White.

Sholl, L. B., Sales, E. K., & Langham, R. (1939). **Three Cases of Cerebellar Agenesia.**—*J. Amer. vet. med. Ass.* **95.** 229-230. 3 figs.

Cases of agenesia of the cerebellum in a dog, of the vermis cerebelli in a lamb, and of the cerebellum and gall-bladder in a kitten are described. In each case the animal was unable to stand. In the dog, autopsy revealed flattening of the cerebral convolutions and complete absence of the cerebellum; in the lamb the vermis was entirely replaced by fluid, and in the kitten the cerebellum was much smaller than normal, the gall-bladder was completely absent, the bile ducts occluded, and the subcutaneous tissues markedly icteric.—D. D. Ogilvie.

Saunders, J. E. (1939). **Sway-Back in Lambs.**—*Vet. Rec.* **51.** 785-786. [2 refs.]

This is an account of an outbreak which resulted in the loss of 30 out of 150 lambs; it includes a description of the symptoms observed and of the P.M. findings in five animals examined [see also *V. B.* **7.** 131].—W. J. Ironside.

Sholl, L. B. (1939). **Stiff Lamb Disease in Michigan.**—*J. Amer. vet. med. Ass.* **95.** 108-109. [1 ref.]

Very heavy losses from this disease occurred during the spring of 1939, which was notable for the cold and wet conditions prevailing during April. Brief details

are given of the types of rations used in affected flocks and of the main P.M. findings. Three lambs showing typical symptoms were provided with a diet of whole milk, gelatine and wheat germ oil, and a marked improvement was noted in each case.—Alastair N. Worden.

Hammer. (1939). Ueber Hautleiden und äussere Leiden der Elefanten. [**Skin Diseases of Elephants**].—*Berl. Münch. tierärztl. Wschr.* May 12th. 293-295; May 19th. 309-312; May 26th. 325-329, and June 2nd. 341-344. 4 figs.

The first part of this article deals with the habits of the African and Indian elephant and with such matters as pregnancy, restraint and the general principles of the treatment of disease in elephants.

The thickness of the skin is 18-25 mm., and the panniculus carnosus is well developed and very powerful. Skin diseases are considered under two main headings—those occurring in the course of constitutional diseases and local skin diseases. The former include skin swellings in anthrax, elephant pox (relation to human smallpox not known) and foot and mouth disease. In F. & M. disease, vesicles may occur in the mucosa of the trunk, in the tongue or buccal mucosa, and in the toes. In the latter situation, pus formation may occur secondarily with separation of the horny sole. Affected feet should be protected by sacking or by a leather boot.

An interesting local condition is inflammation of the temporal glands which are situated midway between the eye and ear. During oestrus these glands secrete an oily fluid with a sweet odour which attracts members of the opposite sex. Suppuration of these glands may occur. Skin abrasions on the legs commonly result from the chains and ropes used to restrain elephants. Suturing of wounds should be avoided unless absolutely necessary; strong adhesive plaster should be used to hold the edges in apposition. If suturing is needed silver wire should be used and interrupted sutures 3-4·5 cm. apart inserted. Snake bites, due mainly to cobra and viper, are common. Bursal swellings at the carpus and tarsus are met with in elephants which have only very hard ground on which to lie. Other local lesions include hoof cracks in animals constantly standing in water, and ulceration in the frontal region caused by moving tree trunks with the unprotected head—to prevent this a pillow should be fixed in position.

The various external parasites of elephants are mentioned and suitable treatment is suggested. Finally, H. describes in detail eleven different cases of varying nature and interest.—E. G. White.

Verge, J., Buck, G., Drieux, H., & Florence, G. (1939). Le granulome de Roeckl chez le zébu. [**Roeckl's Granuloma in Zebu Cattle**].—*Rec. Méd. vét.* **115.** 257-262. 4 figs. [1 ref.]

" Roeckl's granuloma " has only been previously recorded in unhumped cattle and characterized by multiple inflammatory nodules in the subcutaneous tissue and superficial musculature having a histological structure suggestive of tuberculosis. The present paper describes four cases in zebus in Madagascar. The histology is similar to that described in unhumped cattle. No acid-fast organisms could be found in sections and g. pigs inoculated with material from all four cases failed to develop TB.

There are two views concerning the disease—that it is due either to blastomycosis or to TB. The latter is now considered the more likely, and it is possible that the lesions represent a particularly violent tissue reaction to the tubercle bacillus in which the organisms are destroyed [see also *V. B.* **7.** 545, and **8.** 459].

—E. G. White.

ANDERSON, O. D. (1939). **Two Cases of Experimental Neurosis in Dogs of Known Genetic Constitution.**—*Amer. J. Physiol.* **126.** P421-P422. [Original copied *verbatim*].

In a group of 26 dogs of known hybrid stock in which salivary and motor defensive conditioned reflexes were tested for a year, two individuals developed experimental neurosis. These dogs were selected from a large number of animals employed in the experiments of Charles R. Stockard at the Cornell Anatomy Farm. An adult female from the second generation of a cross between Saluki and Basset-hound strains showed signs of shyness when the first attempts were made to establish a differentiation of salivary conditioned reflexes between a rapid metronome as signal for food and a slow metronome without food. The positive reflex, weak from the start, almost vanished when the negative signal was introduced and food was refused, the animal standing quietly throughout the experiment. After 5 months there supervened a phase of extreme restlessness and non-co-operation with absence of the salivary conditioned reflex. It was enhanced by the no-food signal and was still observed after two years of testing.

An adult male of the same genetic constitution was also timid at the beginning of the experiments. A fast metronome signalled a weak break shock to the fore-limb. A slow metronome was the no-shock signal. When the slow metronome was introduced the differentiation failed to develop and the positive conditioned reflex gradually disappeared. During this phase the dog stood with a peculiar rigidity and without movement. The limbs resisted passive flexion and could be moulded by the experimenter. When he crossed the forelimbs and extended one hind limb the dog would hold such a pose for as long as 20 minutes. After a month a phase of extreme neuro-muscular activity supervened which was still maintained at the end of a year.

ALLEN, A. C. (1939). **Nature of Vegetations of Bacterial Endocarditis.**—*Arch. Path.* **27.** 661-671. 7 figs. [Numerous refs.] [Author's summary copied *verbatim*].

The structure of the vegetations in 24 cases of acute and subacute bacterial endocarditis was studied with the aid of differential connective tissue strains.

In agreement with current descriptions, the bulk of each of these vegetations was found generally to consist of a necrotic zone beneath a layer of bacteria.

Isolated clumps, fragmented strands and segmented bits of typical adult elastic and collagenous tissue, easily distinguished from granulation tissue or fibrin, were found scattered through the necrotic zone in both acute and subacute vegetations. *These fibers are considered evidence of a destructive rather than of a reparative process.*

The question as to whether or not this necrotic zone is really essentially a platelet mass, in accordance with the current concept, is discussed on the basis of morphologic observations.

It is concluded, contrary to the long established current concept, that the bulk of a vegetation of acute or of subacute bacterial endocarditis is derived from components of inflamed and fibroplastically deformed valves and is not derived from blood flowing over the valves.

LOEFFLER, L. (1939). **Genesis of Infarction.**—*Arch. Path.* **28.** 323-330. 3 figs. [10 refs.] [Author's summary copied *verbatim*].

The complete and sudden stoppage of the blood supply to the intestines (and probably to any organ) results in anaemic necrosis. A hemorrhagic infarction is due to a special condition. Blood must enter the affected area after the initial closure; this blood must come to stay under high pressure. This is realized in

cases of combined arterial and venous occlusion, of incarcerated hernia, of volvulus, of intussusception. In none of these cases is there a sudden and complete stoppage of the circulation.

Where the blood in hemorrhagic infarcts comes from seems to be of minor importance. It may come from patent veins or arteries or from collaterals.

It is postulated that the conditions leading to anaemic or hemorrhagic necrosis are the same in any organ.

CARPENTER, C. D., & MARTIN, J. H. (1939). **A Genetic Approach to the Control of Adult Mortality in the Fowl.**—*Poult. Sci.* **18.** 168-174. 1 fig. [7 refs.]

The authors review the history of the poultry industry in America, indicating factors which have influenced the development of the industry, particularly in relation to the resistance of the birds to disease. The historical survey is divided into three periods :– (1) 1901-1912—the introduction and development of balanced rations aimed at increasing egg production ; (2) 1913-1924—the introduction of trapnest records, with its resultant effect upon breeding operations, and (3) 1925-1936—the great increase in adult mortality which threatens to hold up further development of the industry.

The authors believe that more is to be hoped for from breeding operations than from nutrition and management in increasing the resistance of the stock to disease. They review the experiments which demonstrate the possibilities in this direction and suggest certain lines of approach which can be followed in spite of the relatively scanty knowledge possessed of the problem.

Briefly, the method advocated is to expose representatives of the various breeds, selected on a basis of production and other desirable qualities, to the major common diseases in turn at the most susceptible age, and to breed, interbreed and line-breed from the survivors. Methods of controlling the experiments are outlined. At the same time the authors advocate that the mechanism of inherited resistance to disease should be investigated.—L. E. HUGHES.

HUTT, F. B. (1939). **Breeding Strains of Poultry Resistant to Fowl Paralysis.** —*Harper Adams Util. Poult. J.* **24.** 395-399. 6 tables.

Experimental data are furnished on the success of breeding strains of fowls resistant to neoplasms of various kinds which account for a large proportion of deaths. The success is considered to be the result of breeding and not due to sanitation and environmental conditions. Analysis of figures from two New York laying tests over the six years (1931-1937), showing causes of death in fowls, is made.

Progeny testing is effective to establish such strains. While simple characters as single comb and rose comb are genetically dependent on one or two genes, complex factors, like resistance to disease, are governed by multiple genes. Increased mortality in laying flocks during recent years is popularly attributed to a rise in production, but H. has shown by figures that it is not so, with particular reference to the laying trials at the Harper Adams Agricultural College.

In the breeding experiments, the test period was 500 days, and White Leghorns were used. No culling was employed during the above period. In two generations of selection, the death rate among adult birds in the resistant line showed a significant reduction, while there was a rise in the number of deaths in the line bred for increased susceptibility for neoplasms.—S. G. IYER.

—. (1938). **Discussion on Fowl Paralysis.** [Speakers : DALLING, T., FRASER, A. H. H., DOWNHAM, K. D., SCHOFIELD, F. W., LAMONT, H. G., WATSON,

E. A., Hopkirk, C. S. M., du Toit, P. J., Olver, A., Purchase, H. S., Daubney, R., Dobson, N., & Orr, J.]—*Rep. 1st Imp. vet. Conf. Lond., 1938.* pp. 57-61.

Dalling gave a general account of F.P. and remarked on the loss caused by it to the poultry industry. The aetiology was still obscure but evidence pointed to an infectious agent being responsible. Internal parasites, although frequently associated with the disease, did not appear to be the initial cause but might have some influence on its occurrence. Resistance or susceptibility might be transmissible by individual birds to the progeny. The disease could be transmitted artificially, but this depended on the susceptibility of the birds used. Birds bred from the survivors of an outbreak were not necessarily resistant. Fraser was of the opinion that an infectious agent was responsible, and referred to an outbreak in which four separate breeds were attacked simultaneously by the disease. Several speakers commented on F.P. as it occurs in various countries, the general opinion being that the condition is due to an infectious agent.—Hugh N. Spears.

Grasovsky, Y. S. (1939). **Preliminary Notes on a Hitherto Undescribed Poultry Disease.**—*J. Amer. vet. med. Ass.* **95.** 71-72. 7 figs. [1 ref.]

A disease is described which was seen in Rhode Island Red pullets, rarely in hens and not at all in male birds. In a typical case the lesions comprised necrosis with scab formation on the comb and wattle, on the skin of the under surface of the wing, the shanks, the feet and the region of the vent. The internal lesions were not so constant; sometimes abscesses were seen in the spleen, and more rarely, in the liver. In some cases haemorrhages and inflammation were present in the wall of the proventriculus. The histological appearance of the lesions is described in detail. Attempts at transmission failed to reproduce the disease; no parasite was isolated.—L. E. Hughes.

Lacassagne, A. (1938). Statistique des différents cancers constatés dans des lignées sélectionnées de souris aprés action d'hormones oestrogènes. [**Malignant Tumours Following Prolonged Administration of Oestrogenic Hormones**].—*Bull. Ass. franç. Cancer.* **27.** 96-116. 8 figs., 5 tables. [Numerous refs.] [Abst. in *Arch. Path.* **28.** 416 copied *verbatim.* Signed I. Davidsohn].

This is a statistical analysis of data collected during six years, concerning which several preliminary reports have been published since 1932. Selected strains of mice, some with a high and some with a low incidence of mammary adenocarcinoma in females, some known to be very rarely afflicted with spontaneous malignant tumors, were given, beginning soon after birth, weekly injections of estrogenic hormones. Mammary adenocarcinoma was observed only in strains normally subjected to it, but in larger numbers and earlier than normally, and in males as well as in females. A varying number of epithelial and connective tissue tumors appeared in strains normally known to be free from such tumors. L. concludes that estrogenic hormones played a part in the production of the tumors.

Turner, F. C. (1939). **Effects of Extracts of Human Urine on Tumors in Mice.** —*Publ. Hlth Rep., Wash.* **54.** 1855-1863. 1 fig., 5 tables. [2 refs.] [Author's summary copied *verbatim*].

A growth inhibiting substance derived from human urine prevented, to a limited degree, the formation of tumors in mice following injection of cancerigenic chemicals, but the urinary derivative had little, if any, specific inhibiting effect on transplanted or spontaneous tumors in mice.

MURRAY, M. (1939). **Effect of Thymus Transplants on Tumor Growth.**—*J. Lab. clin. Med.* **24.** 1245-1250. 5 figs. [2 refs.] [Author's summary copied *verbatim*].

1. Transplanted thymus from rats and dogs exerted marked inhibition of tumor growth and caused them to be absorbed in a high percentage of all rats experimentally inoculated with Francis C. Wood's rat breast tumor. Calf thymus did not show such effect.

2. The thymus was observed uniformly to be extra large in rats found immune to tumor transplants.

NUTRITION IN RELATION TO DISEASE

RIGG, T. (1937). **Soil Deficiencies in New Zealand.**—*Rep. Aust. Ass. Adv. Sci. 1937.* pp. 401-422. 14 tables. [Numerous refs.]

This article provides a concise account of some of the more important investigations on soil deficiencies in New Zealand. R. quotes work on iodine deficiency to support the view that factors other than iodine deficiency operate in the production of goitre in New Zealand. Data are included showing the association of cobalt deficiency in soil and pasture in those areas where stock may develop " bush sickness ". Drenching with cobalt supplements, the use of a cobaltized salt lick containing 4 oz. of cobalt chloride per ton of salt, or top-dressing with cobaltized superphosphate to give the equivalent of from 10 lb. to as little as 2 lb. of cobalt chloride per acre, have all proved successful in combating the disease.—M. C. F.

ARNOLD, A., & ELVEHJEM, C. A. (1939). **Nutritional Requirements of Dogs.**—*J. Amer. vet. med. Ass.* **95.** 187-194. 4 figs., 3 tables. [Numerous refs.]

A series of controlled experiments in which four Airedale dogs were fed variable amounts of commercial dog foods have established that with the diet used, dogs of such size, taking the amount of exercise allowed in these experiments require approximately 100 calories per kg. of food per day for maintenance. The experiments further demonstrate that the nutritional requirements of growing puppies are about twice those of maintenance.

The vitamin D requirements of dogs are similar to those of other species, and each pound of food should contain at least 27 I.U. of vitamin. Relative to this figure, the optimum amounts of calcium and phosphorus are 1·2 and 1·0 g. per pound of dog food respectively.

Vitamin B_1 (thiamin) requirements are satisfied by a diet each pound of which contains at least 36 I.U. of thiamin. Sufficient nicotinic acid to cure the symptoms of blacktongue and to restore weight is present in a diet which contains 4·3 mg. of the vitamin per pound. The prophylactic requirement, however, is undoubtedly lower. Similarly a diet containing at least 0·4 mg. of riboflavin per pound is necessary to prevent the onset of yellow liver. Such amounts are easily provided by feeding as much of the diet as possible in the fresh state.—D. D. OGILVIE.

MCCANDLISH, A. C. (1939). **Skim Milk Powder for Calves and a Comparison of Various Supplemental Feeds.**—*Res. Bull. Milk Prod. W. Scot. agric. Coll.* No. 7. pp. 64. 20 tables. [Numerous refs.]

A review is given of the literature dealing with the feeding and management of calves, and related problems, including work on the death rate of calves and the report of three trials on a fairly large scale conducted to determine the relative values of raw and pasteurized milk.

The experimental work reported consisted of feeding trials on 74 calves over a period of ninety days, chiefly concerning the possible infection of calves with tuberculosis by means of skim milk powder. Other questions involved were the gains in weight produced by skim milk powders, protein supplements, and the use of whole or ground grain and of sprouted maize for young calves.

Out of 62 calves fed for ninety days on skim milk powder prepared by the roller process from milk infected with tubercle bacilli, not one reacted to the tuberculin test and no lesions of tuberculosis were found P.M. It is therefore concluded that skim milk powder carefully prepared by the roller process is safe for calves so far as infection with TB. is concerned.

The results of the feeding trials showed that skim milk powder (both reconstituted and as powder) gave satisfactory results and can be used successfully in calf rearing. Equal parts of whole oats, whole maize, linseed cake and bran comprised a satisfactory protein supplement for calves on whole milk or skim milk powder; decorticated earthnut cake or herring meal can be used in replacement of the linseed cake, and sprouted grain fed in limited quantities was found satisfactory.—R. ALLCROFT.

I. MARSTON, H. R. (1938). **Studies on Coast Disease of Sheep in South Australia. I. Introduction.**—*Bull. Coun. sci. industr. Res. Aust.* No. 113. pp. 9-13. [6 refs.]

II. MARSTON, H. R. (1938). **Studies on Coast Disease of Sheep in South Australia. II. The Symptomatology and Aetiology of " Coast Disease " and Its Relationship with some other Maladies Affecting Grazing Ruminants.**—*Ibid.* pp. 14-22. [Numerous refs.]

III. BULL, L. B., MARSTON, H. R., MURNANE, D., & LINES, E. W. L. (1938). **Studies on Coast Disease of Sheep in South Australia. III. Ataxia in Young Lambs.**—*Ibid.* pp. 23-27. 1 fig. [9 refs.]

IV. THOMAS, R. G. (1938). **Studies on Coast Disease of Sheep in South Australia. IV. The Influence of Geological Conditions and Soil Composition on the Regional Distribution of " Coast Disease " in Sheep in South Australia.**—*Ibid.* pp. 28-39. 1 fig., 1 table. [3 refs.]

V. MURNANE, D. (1938). **Studies on Coast Disease of Sheep in South Australia. V. Distribution of " Coast Disease " in South Australia.**—*Ibid.* pp. 40-47.

VI. LINES, E. W. L. (1938). **Studies on Coast Disease of Sheep in South Australia. VI. Investigations on Kangaroo Island.**—*Ibid.* pp. 49-71. 8 tables, 12 graphs. [8 refs.]

VII. MARSTON, H. R., & MCDONALD, I. W. (1938). **Studies on Coast Disease of Sheep in South Australia. VII. The Effects which follow Treatment of " Coast Disease " in Mature Ewes with Cobalt, Copper and other Elements.**—*Ibid.* pp. 72-78. 1 table. [5 refs.]

VIII. MARSTON, H. R., & MCDONALD, I. W. (1938). **Studies on Coast Disease of Sheep in South Australia. VIII. The Effects of Administering Cobalt, Copper and other Elements to Young Sheep Depastured on " Coasty " Country.**—*Ibid.* pp. 79-85. 1 fig., 7 tables.

IX. MOORE, H. O. (1938). **Studies on Coast Disease of Sheep in South Australia. IX. Iron and Copper in Certain Organs from Sheep with " Coast Disease ".**—*Ibid.* pp. 86-91. 2 tables. [10 refs.]

I. The historical background of " coast disease " in South Australia is briefly presented, and the development of the full programme of recent research described.

II. The clinical picture of sheep suffering from " coast disease " is marked by loss of vigour, loss of body weight and anaemia. The course of the disease is more rapid in some areas than in others. At autopsy the only change distinguishing the condition from general malnutrition is a degree of haemosiderosis of the liver and pancreas. This is more easily distinguished in the somewhat orange-coloured pancreas. The rapid improvement in vigour which follows the removal of affected animals to sound country is characteristic of the disease.

The similarities between " coast disease " and enzootic marasmus of Western Australia, " bush sickness " of New Zealand, " pining disease " of Scotland, nakuruitus of Kenya and salt sickness of Florida are also discussed.

III. Ataxia in lambs is described, and its relation to " coast disease" discussed. It usually occurs on " coasty " country in South Australia, but is also observed occasionally in areas where typical " coast disease " is unknown.

IV. Consideration has been given to the geological conditions and the geochemistry of the soils in areas where " coast disease " is enzootic. The disease is confined to the highly calcareous coastal dunes, the soil of which consists almost entirely of wind-borne shell fragments. The thesis that " coast disease " is due primarily to a deficiency in the soil and pasture, it is maintained, is in no way inconsistent with the geochemistry of affected areas.

V. A disease survey of the coastal areas of South Australia was carried out and the distribution determined. It is estimated that upwards of 2,000 square miles may be considered affected. The survey showed clearly that in some areas the incidence of the disease is extremely high, while in others, which may be regarded as transitional, the incidence and severity of the disease is far less. In some parts there is a sharp demarcation between " coasty " and sound country.

VI. Early investigations on Kangaroo Island showed that "coast disease" could not be attributed either to phosphorus deficiency or to simple starvation. Copper or iron added to the diet produced no response in affected animals. Cobalt alone induced little response, but when given with copper and other salts a rapid improvement in the health of sick animals was noted. Animals provided with a lick based on Jansen's salt mixture containing iron, copper, cobalt, zinc and eight other elements developed normally over two generations.

VII. An experimental area was established at Robe where the incidence and severity of " coast disease " are greater than on Kangaroo Island. Administration of Whangarei limonite or of iron and copper to mature affected sheep produced a temporary improvement, but failed in all cases to arrest the course of the disease and prevent the ultimate death of the animal. Treatment with cobalt (as cobalt nitrate) and copper (as copper sulphate) brought about definite improvement and restored most of the sheep to apparently normal health.

VIII. Treatment with copper salts alone exerted no effect on the progress of " coast disease " in ewe weaners " depastured " at Robe on the south-east coast of South Australia. Treatment with cobalt salts alone permitted growth in some animals, but failed to avert the development of anaemia. Treatment with cobalt and copper together enabled satisfactory growth to be made, restored mild cases to apparently normal health and prevented progressive anaemia. Treatment with cobalt, copper, nickel, zinc, manganese and iron together resulted in good growth and in most cases the animals maintained a normal haemoglobin level.

It is tentatively suggested that the primary cause of " coast disease " is a dual deficiency of cobalt and copper in the pastures of affected areas.

IX. It was found that the iron content of the liver of animals affected with " coast disease " is greatly increased and that smaller increases occur in the spleen and kidney. The copper content of the liver is, however, reduced much below

the average normal level, but there is no significant alteration in the amount of copper in the blood.—H. B. CARTER.

I. GREIG, J. R., DRYERRE, H., CORNER, H. H., & SMITH, A. M. (1938). **Border Pine.**—*Vet. J.* **94.** 335-341. 2 tables. [11 refs.]

II. CORNER, H. H. (1939). **Cobalt as a Factor in the Control of Nutritional Anaemia [Pine in Sheep].**—*Brit. med. J.* July 22nd. 169-170. [14 refs.]

I. A brief discussion of the history of " pine " in the Cheviot region of Scotland is given, followed by description of some incomplete experiments in which a mineral mixture containing 36% Fe_2O_3 was fed to sheep in an attempt to prevent the disease. Inconclusive results were obtained owing to the low incidence of " pine ". Four other cases of " pine " were successfully treated by regular one drachm doses of iron ammonium citrate. Of 60 lambs in another experiment, 30 received some 14 doses of one drachm of the citrate. Hb estimations 4-5 months afterwards showed that the treated group averaged 10·3 g. % (range 7·7-11·9) as compared with 9·4 g % (range 7·2-11·5) in the untreated group without any suggestion of statistical significance of the difference; the treated group gained more in weight than the untreated. The possibility of a Cu impurity of 10 p.p.m. in the citrate being responsible for the haematological improvement in " piners " so treated was not substantiated by independent Cu treatment. A limited number of faecal worm-egg counts showed that the " piners " had over 17 times the number of eggs of the non-piners. A reference to the Australasian work on Co is made, and its possible significance to the pining problem is discussed. The authors regard the helminthological side of " pine " as being only of secondary importance in contrast to the views of STEWART and PIERCY [*V. B.* **6.** 451]. They admit the incompleteness of the results recorded, and tentatively conclude that the Cheviot " border pine " is an anaemia of the chlorotic type and that the condition may be prevented and cured by the administration of iron ammonium citrate.

II. This article is a recapitulation of the history of the disease " pine " in sheep and of the Australasian work on Co in connection with related anaemic conditions, followed by a review of the work of GREIG *et al* [see I, above] and of CORNER and SMITH [*V. B.* **9.** 882.] in which cure was effected by massive doses of iron ammonium citrate or hydrated iron oxide, or by very small doses of Co salts. Co impurities in the Fe compounds are suggested as the curative agents. " Pine " is regarded as a nutritional anaemia, preventable or curable by doses of Co. [No mention is made of the very important helminthological aspect of " pine ", although C. admits that " the underlying cause of the disease may be found elsewhere than in a deficiency of Co ". The view that Co has been of value because of a breakdown in the metabolism of some other elements concerned in nutrition is akin to that of MARSTON *et al* (1938) [*V. B.* **8.** 723.] who state that these diseases (" pine ", " bush-sickness ", " coast disease ", etc.) may be due to a breakdown in a chain of metabolic events of which Co is a link].—ALFRED EDEN.

MORRIS, S., & RAY, S. C. (1939). **The Effect of a Phosphorous Deficiency on the Protein and Mineral Metabolism of Sheep.**—*Biochem. J.* **33.** 1209-1216. 9 tables. [Numerous refs.]

Four sheep were fed various diets to determine the effect of P deficiency upon the protein and mineral metabolism. These diets were (a) low P, with a Ca:P ratio of 5:1, (b) the same diet supplemented with Na_2HPO_4, giving a Ca:P ratio of 1:1, and (c) the initial diet supplemented with adequate Ca and P though still preserving the initial Ca:P ratio. Complete balance studies were made with each

ration in turn, the initial ration being fed again in a final period. The food intake adjusted to the animal's appetite appeared to vary directly with the P intake, being lower on the P-deficient diet. An increased output of urinary N was noted under conditions of P deficiency and analyses of the various urinary N fractions showed that endogenous N metabolism was lowered and the exogenous N unaffected under the conditions. Ca-balance studies showed that there were losses of both Ca and P on P-deficient diets, but with improved P intake there was a positive Ca balance and the negative Ca balance diminished. Similarly in the deficient periods the amount of S excreted in the urine was lowered. Under conditions of P deficiency, the proportion in the urine of total Ca excreted rose from 0·5-5%, supporting the theory that an excess Ca over P in the diet, whether under conditions of actual P deficiency or not, may tend to a deficiency of both Ca and P.—Alfred Eden.

I. Gallup, W. D., & Norris, L. C. (1939). **Assimilation and Storage of Manganese in the Developing Embryo and Growing Chick [Perosis].**—*Poult. Sci.* **18.** 99-105. 5 tables. [5 refs.]

II. Sherwood, R. M. (1939). **The Effect of Certain Mineral Salts on the Amount and Severity of Perosis.**—*Ibid.* 165-167. 3 tables. [4 refs.]

I. Estimations of Mn in the developing chick embryo at regular intervals between the 9th and 21st days of incubation showed that at 9 days the embryo contained its maximum Mn content of 0·613 mg. per 100 g. dry weight. After this period there was a constant decrease in Mn in relation to dry weight until the 18th day, after which the decrease was less rapid. Approximately 75% of the Mn in the yolk was assimilated by the embryo during incubation.

The assimilation and distribution of Mn during growth was determined with two groups of chicks, one of which received a low Mn diet containing 10 p.p.m. Mn and the other a diet of medium Mn content of 50 p.p.m., until 30 days of age. The data show that the Mn content of the chicks on the low Mn diet was at all times lower than that of their controls receiving the higher amount of Mn, but chicks in both groups showed some increase in Mn content during the first 5 days, but afterwards there was no further increase until about the 24th day. This period of low Mn retention during rapid growth coincided with the period of increased susceptibility to perosis. The Mn content of the livers of chicks on the low Mn diet dropped from 0·485 mg. to 0·284 mg. per 100 g. during the first 5 days, and thereafter increased gradually until it reached 0·474 mg. on the 30th day, while the livers of the chicks on the higher Mn diet did not show such a marked variation in Mn content. In both groups the Mn content of the bones (tibiae and femurs) decreased during the growing period of 30 days.

II. The efficiency in the prevention or control of perosis by the addition of Mn, Al, and Fe as sulphates to a basal diet low in Mn (9 p.p.m.) is compared with the protection given by the addition of wheat grey shorts and ash of wheat grey shorts to a similar basal diet. 624 single Comb White Leghorn chicks of like breeding were used in the experiment, which lasted for twelve weeks. The addition of 37 p.p.m. of Mn to the basal diet, making a total of 46 p.p.m. of Mn, gave almost complete protection, but addition of 27 p.p.m. of Al and Fe did not prevent perosis. The ash of 20% wheat grey shorts when added to the basal diet did not give quite as complete protection as did the use of 20% wheat grey shorts.
—R. Allcroft.

Fiennes, R. N. T. W. (1939). **A Suspected Mineral Deficiency amongst Cattle in Uganda.**—*E. Afr. agric. J.* **5.** 68-70. 2 figs.

A possible deficiency disease is reported amongst cattle in the Lake Salisbury district of Uganda. After the December rains the upland grass withers away and

cattle have to subsist on bulky fodder along the lake shore from which the water has receded. The disease which develops resembles the *stywesiekte* of South Africa, characterized by symptoms of debility, a peculiar crossing of the knee joints on standing, a jerky gait, overgrowth of horn on the front feet and chronic laminitis, although there are no marked symptoms of pica. The suggestion is made that the poor quality of the vegetation is due to leaching of the soil by alternate flooding and draining resulting in mineral deficiency, but there is little chemical evidence to support this. The disease may be due to poisoning by *Crotalaria* spp. or by insufficient P in the diet; soil and grass analysis is being undertaken to determine this. In an appendix is included a list of the commoner swamp and upland grasses.—Alfred Eden.

Rehmet, J. (1938). Ueber den Mangangehalt im Kot und Harn gesunder Haustiere und einiger lecksuchtkranker Ochsen. [**Manganese Content in Urine and Faeces of Healthy Domestic Animals and of Cattle with Pica**].—*Inaug. Diss., Berlin.* pp. 15. 5 tables. [Numerous refs.]

In the faeces of 13 healthy cattle fed on turnips, hay and oat straw the average Mn content was 30·03 mg. in 100 g. dry faeces; in that of 8 horses fed on oats, bran and hay it was 32·99 mg., and in that of 8 sheep fed on turnips and hay it was 57·14 mg. The method of estimation and other essential data are given in detail. An ox with pica was found to excrete abnormally large amounts of Mn in the faeces, in an amount in excess of that present in the hay which was being fed; the reason for this was not found.

No Mn was found in the urine of either healthy or diseased animals.—G. W.

Blumer, C. C., Madden, F. J., & Walker, D. J. (1939). **Hypocalcaemia, Grass Tetany or Grass Staggers in Sheep.**—*Aust. vet. J.* **15.** 24-27. 1 table.

An account is given of heavy losses amongst pregnant and lactating ewes during June and July 1938 in northern areas of New South Wales. The losses were associated with lush grazing conditions. The authors suggest that the condition was either grass tetany or an allied complaint characterized by an insufficiency of Ca or a disturbance in the Ca/Mg balance in the blood serum, or by both. The symptoms, which are described, are similar to those given by others in connexion with hypocalcaemic cases. Biochemical examination of blood from affected animals revealed a hypocalcaemia and a hypermagnesaemia of varying intensity. Intravenous injections of from 20 ml. to 40 ml. of equal volumes of a 15% aqueous suspension of calcium gluconate and 5% aqueous solution of magnesium sulphate were followed by rapid recovery.

It is suggested that many losses hitherto ascribed to "lamb's tongue" (*Chenopodium atriplicinum*) poisoning were actually due to hypocalcaemia.

—M. C. Franklin.

Baumann, E. J., & Sprinson, D. B. (1939). **Hyperparathyroidism Produced by Diet.**—*Amer. J. Physiol.* **125.** 741-746. 2 tables, 1 chart. [7 refs.] [Author's summary copied *verbatim*].

Hyperparathyroidism in rabbits has been produced by feeding a low Ca high P diet. This diet causes enlargement of the parathyroids to two or more times their normal size and hypertrophy of the cells and nuclei with an increase in the amount of lipids in the cytoplasm. Serum Ca and P are low but within the normal range, while serum phosphatase is possibly less than normal. Aside from increased vascularity no important changes were found regularly in the bones. The Hamilton and Schwartz test for parathormone is always high.

Foy, H., & Kondi, A. (1939). **Response of Nutritional Macrocytic Anaemia to Anahaemin.**—*Lancet.* **237.** 360-363. 5 figs. [6 refs.]

Data are given which show that nutritional macrocytic anaemia in women as seen in Macedonia responded as readily to highly purified preparations such as anahaemin as it did to the cruder liver preparations such as " procythal forte " and large doses of " campolan ".—R. Allcroft.

Lowe, J. T., Steenbock, H., & Krieger, C. H. (1939). **Cereals and Rickets. IX. The Availability of Phytin-P to the Chick.**—*Poult. Sci.* **18.** 40-44. 2 tables. [Numerous refs.]

Groups of day-old White Leghorn chicks were fed for periods of three and five weeks on rations prepared from a basal diet low in P and having a Ca : P ratio of 0·4:1, by supplementing it with calcium carbonate and with dibasic sodium phosphate or phytin at equivalent levels of P. At the end of the experimental period, bone ash determinations were made, and the results showed that by increasing the P content of the basal ration by 50 % by the addition of phytin, no significant improvement in the calcification of the bones of the chicks occurred, but the addition of an amount of P equivalent to the phytin P as dibasic sodium phosphate raised the ash approximately 10 %.—R. Allcroft.

Esselen, W. B., Jr. (1939). **Nutritional Gizzard Lesions in Chicks.**—*Poult. Sci.* **18.** 201-209. 1 fig., 5 tables. [19 refs.]

Examination of gizzards of chicks fed from 1-4 weeks on the Massachusetts State College chick ration, and the gizzard-lesion-producing diets of Almquist and of Bird, showed that the Massachusetts State College chick ration gave practically complete protection against gizzard lesions, while Almquist's diet was more effective than Bird's in producing the lesions. The addition of a mixture of 15 % each of wheat middlings, wheat bran, and oat groats, and 4 % of alfalfa leaf meal to the Almquist diet rendered it almost as effective in preventing gizzard lesions as the Massachusetts State College ration which contained these components, among others, in the same proportion.

The effect of the curative action of dried pork lung, alfalfa leaf meal, soya bean meal, oat groats, wheat middlings and Massachusetts State College ration showed that the last was most effective and the alfalfa leaf meal next. That chicks do not store any great amount of the anti-gizzard lesion factor in their bodies was demonstrated by the development of lesions in chicks given the Almquist diet after being fed a preventive diet for one or two weeks.

A preliminary study with turkey poults indicated that young turkeys are either not susceptible to nutritional gizzard lesions or are much more resistant to them than are chicks.—R. Allcroft.

Lund, A. (1938). Experimentelle Undersøgelser vedrørende Svinets Avitaminose-A. [**Avitaminosis A in Swine**].—*Beretn. Forsøgslab., Kbh.* No. 180. pp. 295. 63 tables, 45 graphs. [Numerous refs.] [English summary].

L. states that the results of the comparative feeding experiments described in this paper, which were carried out on a total of 44 piglets, showed that deficiency of vitamin A in the diet after weaning did not cause primary cessation of their growth, measured as gain of protein, or reduce utilization of food energy. It did however, gradually lower the appetite of the animals, resulting in a tendency of the gain of energy and of the gain in liveweight to be smaller in the animals that did not receive vitamin A. In swine the symptoms of avitaminosis A are said to

consist chiefly in disturbances of the nervous system, such as ataxic gait, pronounced inco-ordination, spasticity with gradually increasing convulsive fits, paralysis, and frequently reduced power of vision. These or other avitaminotic symptoms are stated not to have developed in the piglets which received daily 4,000-5,000 units of vitamin A as fish-liver oil, or 1·2-2 mg. carotin, corresponding to 2,000-3,500 units of vitamin A, or 1·8-2·3 mg. zeaxanthin with 0·2-0·25 mg. carotin. Xanthophyl was not effective in preventing the symptoms. For practical purposes, to ensure that pigs should receive sufficient vitamin A (or provitamin A) it is recommended that their diet should contain ample quantities of natural vitamin A-active carotinoids.

Wooley, D. W., Waisman, H. A., & Elvehjem, C. A. (1939). **Studies on the Structure of the Chick Antidermatitis Factor.**—*J. biol. Chem.* **129.** 673-679. 1 table. [9 refs.]

The results of studies on the constitution of the chick antidermatitis factor obtained from liver extract showed that it is composed of β-alanine united through its amino group to the carboxyl of a hydroxy acid. Since Williams has shown that his growth factor for yeast is similarly constituted of β-alanine and a hydroxy acid, it is thought probable that the two substances are identical.—R. Allcroft.

Pearson, P. B. (1939). **The Nicotinic Acid Content of the Blood of Mammalia.** —*J. biol. Chem.* **129.** 491-494. 1 table. [10 refs.]

A modification of the method of Swaminathan for the estimation of nicotinic acid in blood is briefly described; it was used to determine the nicotinic acid content of the blood of dogs, pigs, sheep and horses. The average values for the dog, pig and horse were of the same order, *viz.*, about 0·5 mg. per 100 c.c. blood; that for sheep was 0·83 mg., but the range for sheep varied among the 22 animals used from 0·36 to 1·33 mg. per 100 c.c. blood. The low values for all four species were very similar. Determinations were made on the blood of a second group of five sheep which received a diet low in nicotinic acid, but the values obtained from these animals did not differ materially from those of the first group and were in fact slightly higher. It was found that nicotinic acid existed almost entirely in the erythrocytes.—R. Allcroft.

Weitzenberg, R. (1939). Ueber den Askorbinsäuregehalt der Leber und Nebenniere einiger Haustiere. [**Ascorbic Acid of the Liver and Adrenals of Some Domestic Animals**].—*Arch. wiss. prakt. Tierheilk.* **74.** 228-232. [Numerous refs.]

The ascorbic acid content of livers and adrenals from cattle, sheep, pigs and horses was determined by the methylene blue method of Martini and Bonsignore [(1934). *Biochem. Z.* **273.** 107-177.], and average values for normal organs were found to be 20-25 mg. % and 150-170 mg. % respectively. Tuberculosis tended to reduce the values slightly, but significantly lower values were associated with febrile states.—W. R. Muir.

Carver, J. S., Heiman, V., & Cook, J. W. (1939). **A Curative Method for the Assay of Vitamin D with Chicks.**—*Poult. Sci.* **18.** 288-294. 5 figs., 3 tables. [8 refs.]

The technique of the assay involved the use of day-old sexed cockerels placed from 8-10 days on a depletion ration deficient in Ca, P, and vitamin D, so that a severe rachitic condition developed. At the end of the depletion period the chicks

were weighed and those with a weight within ± 5 g. of the mean were selected and distributed into duplicate lots and fed the vitamin D assay ration for a 24-day period. The negative control ration fed to the control lots was supplemented with 1% corn oil instead of cod-liver oil. The results of this assay were measured by the differences over the negative control and of average final body weight, degree of healing of the right tibia, and the bone ash of the left tibia. These methods of estimation of vitamin D showed a good degree of correlation with each other, so that it would appear that the degree of " healing code," or body weight, could be used instead of bone ash for vitamin D assays with chicks.

By projecting on to a straight line of best fit the results of the weight increases, the degree of healing, and the percentage of bone ash over the negative control results, the vitamin D unitage was determined by interpolation in terms of U.S.P. units of vitamin D.—R. Allcroft.

Klose, A. A., Almquist, H. J., & Mecchi, E. (1938). **Properties of the Anti-hemorrhagic Vitamin (Vitamin K).**—*J. biol. Chem.* **125.** 681-686. [5 refs.]

Further studies on the effect of various chemical reagents on the antihaemorrhagic vitamin were made. The activity of the vitamin was destroyed by oxidizing agents, strong acids, aluminium chloride and several reagents which have the ability to add across an ethylenic linkage, but was not appreciably affected by reducing agents or by reagents which react with alcoholic, carbonyl or phenolic groups. The properties of the vitamin are consistent with those of a complex unsaturated hydrocarbon.—R. Allcroft.

Mason, H. C. (1939). **Failure of " Vitamin K " Excess to Heal Encephalomalacia of Chicks.**—*Proc. Soc. exp. Biol., N.Y.* **41.** 50-51. [2 refs.]

A hexane extract of alfalfa leaf meal, homogenized in cream and mixed with milk, was fed in daily levels of 5 mg., 10 mg., 15 mg. and 20 mg. to four series consisting of a total of 120 day-old chicks placed on encephalomalacia-producing diets. 1·0 c.c. of the hexane extract was equal to 10 g. in vitamin K activity of alfalfa meal. Paralysis occurred among chicks receiving excess levels of vitamin K as well as those on the control encephalomalacia-producing diet, and since no differences were observed in the clinical and microscopic pictures of the paralysis which occurred in both groups, it is concluded that encephalomalacia of chicks is not prevented by the administration of a vitamin K excess.—R. Allcroft.

Almquist, H. J., & Klose, A. A. (1939). **Determination of the Anti-Haemorrhagic Vitamin.**—*Biochem. J.* **33.** 1055-1060. 2 figs., 4 tables. [5 refs.]

An improved method for the assay of vitamin K is described. Newly hatched chicks were fed for the first week on a basal diet which permits satisfactory growth and freedom from nutritional disturbances other than vitamin K deficiency, which becomes severe within 7-12 days. Supplements of vitamin K were then included in the diet and the chicks maintained on these diets for two weeks, *i.e.* until three weeks old. For the determination of the clotting ability of the blood the " prothrombin time " method of Quick was adapted to vitamin K assay. Since the results showed that the whole blood prothrombin times were subject to less variability than were the simple blood clotting times, it was thought that the former was a much more consistent measurement of the prothrombin content of the blood. It was found that the reciprocal of the mean blood clotting time and of the mean prothrombin time bears a linear relation to the logarithm of the vitamin K level in the diet over a practical range of levels.—R. Allcroft.

PUBLIC HEALTH

—. (1939). **Report of the Special Committee on Food Hygiene. [Amer. Vet. Med. Ass.]**—*J. Amer. vet. med. Ass.* **94.** 313-322.

Believing that the veterinary profession in the U.S.A. has an important part to play in the future development of official milk inspection work, the Committee conducted a survey to determine (1) the instruction in milk hygiene now available to veterinary students, and (2) the additional or post-graduate instruction desirable for veterinary students wishing to specialize in milk control. On the basis of information furnished by ten veterinary schools, the Committee recommend that a minimum course of instruction should comprise three courses.

(1). A lecture course covering a review of the anatomy and histology of the udder ; the physiology of milk secretion ; the physical and biochemical properties of milk ; the bacteriology of milk, with emphasis on pathogenic bacteria which may gain entrance to milk ; the effect of diseases of the cow and certain physiological conditions on the milk ; the relation of feed, health of the cow, sanitary conditions and dairy methods to the hygienic qualities of the milk ; transmission of diseases to man by milk ; cooling, storage and transportation ; pasteurization ; methods of dairy farm inspection ; the outline of a department of public health, and its milk ordinances and milk sanitation programme, and finally, legal responsibilities in milk sanitation.

(2). A laboratory course including the physical, chemical, biochemical and microscopic methods of examining normal and abnormal milk, and methods of estimating numbers of bacteria in milk, etc.

(3). A practical field course in inspection of dairy farms (including the cattle) and of dairy plants ; this would include field trips to observe varied conditions of production, handling and processing of milk and dairy products.

For the veterinarian wishing to specialize in milk inspection and other phases of food hygiene, considerable post-graduate instruction is recommended, particularly in connexion with the technical application of milk machinery and with legal and administrative procedures.—N. J. Scorgie.

Smith, J. (1939). **Biennial Reviews of the Progress of Dairy Science. Section F. Milk-Borne Diseases.**—*J. Dairy Res.* **10.** 355-369. [Numerous refs.]

The matter is discussed under the following headings :- streptococcal infections, staphylococcal infections, bovine tuberculosis, salmonella infection, dysentery and brucella infections.

de Grolier, A., & Voiculesco, T. (1939). Recherches sur la présence du bacille tuberculeux dans le lait et les produits dérivés. **[Tubercle Bacilli in Milk and Milk Products in Paris]**.—*Ann. Inst. Pasteur.* **63.** 145-158. 2 tables. [16 refs.] [Abst. from authors' summary].

The authors examined 45 samples of pasteurized milk, 22 of butter, 20 of cream, 13 of cheese and 8 of yoghurt, from districts of Paris, for the presence of the tubercle bacillus. Virulent bovine bacilli were isolated in 6 instances ; in 1 sample of butter, 4 of cream and 1 of yoghurt. No tubercle bacilli were found in the 45 samples of pasteurized milk which were examined.

Lorenz, F. W. (1939). **Egg Deterioration Due to Ingestion by Hens of Malvaceous Materials.**—*Poult. Sci.* **18.** 295-300. 1 fig., 1 table. [7 refs.]

Unextracted cottonseed preparations appear to contain two distinct factors which, when fed to laying hens, are responsible for the deterioration of eggs on

storage. The first is extractable with petroleum ether, and is associated with pink discoloration of yolk and albumen and with enlarged yolks; extracts in which it is present give a positive Halphen reaction. The second appears to be gossypol, and is associated with olive-coloured yolks. Feeding of cottonseed or cottonseed meal produces eggs liable to a combination of these defects. Other malvaceous plants contain the first substance.

Hens receiving gossypol in L.'s experiments laid small eggs; those receiving raw cottonseed ceased to lay after eight days.—ALASTAIR N. WORDEN.

BEAUDETTE, F. R. (1939). **Larva of Ephestia kulniella in the Egg of a Hen.**—*Indian vet. J.* **15.** 365. [2 refs.]

B. reports the discovery of a larva of the Mediterranean flour moth, *Ephestia kulniella* in the yolk of a hen's egg. Instances in which larvae of *Ascaridia galli* and *Distomum ovatum* had been found were also referred to.

THERAPEUTICS

OSGOOD, E. E. (1939). **The Culture of Human Marrow as an Aid in the Evaluation of Therapeutic Agents. Studies on Sulfanilamide and Related Compounds.**—*J. Lab. clin. med.* **24.** 954-962. 6 figs., 1 table. [12 refs.] [Author's summary copied *verbatim*.]

These tissue culture methods should prove a valuable supplement to animal experimentation as a guide to clinical investigation, and should be of value in research in many fields of medicine and biology. Illustrative studies herein reported indicate that the action of prontosil soluble, diseptal, and prontylin maltoxide could be explained by the amount of sulfanilamide released, and that these compounds are less effective than equivalent amounts of sulfanilamide itself. These studies also indicate that in pneumococcic infections sulfanilamide plus type specific antipneumococcus serum should be more effective than either alone, or than much larger doses of antipneumococcus serum alone.

MITCHELL, C. A., WALKER, R. V. L., & MCKERCHER, D. G. (1939). **The Use of Sulphanilamide in Anthrax.**—*Canad. J. comp. Med.* **3.** 119-130. 8 figs., 3 tables, 2 charts. [5 refs.]

Sulphanilamide definitely controlled the development of *B. anthracis* in inoculated g. pigs, but was toxic for these animals, which succumbed when given sufficient to maintain a fair amount of the drug in the blood. G. pigs with a few mg. of free sulphanilamide in the blood almost invariably died following the operation of bleeding from the heart. The microscopic picture showed that the capsule of the bacillus was not affected by the drug, but suggested that its growth in treated animals was arrested and that it degenerated and was absorbed by the leucocytes. Scarcely a trace of the drug was found in peritoneal fluid, although the blood and pericardial fluid might be rich in it. Its possible value is suggested in the treatment of anthrax in other animals in which a satisfactory level could be maintained in the blood.—R. GWATKIN.

ZAYTZEFF-JERN, Helen, & MELENEY, F. L. (1939). **Effect on Bacteriophage of Prontylin, Prontosil, Sulfapyridine, and other Antiseptics and Dyes Used in Surgical Practice.**—*J. Lab. clin. Med.* **24.** 1017-1026. 2 figs., 2 tables. [Numerous refs.] [Authors' summary copied *verbatim*].

1. Antiseptics in general cannot be used with bacteriophage in the treatment of mixed infections. Zinc peroxide is no exception to this rule.

2. Sulfanilamide, sulfapyridine, and prontosil may be used with bacteriophage in the treatment of mixed infections.

CARPENTER, C. M., & BARBOUR, G. M. (1939). **Inactivation of Toxins of *Staphylococcus aureus* and *Clostridium welchii in vitro* by Sulfanilamide.**—*Proc. Soc. exp. Biol., N.Y.* **41.** 354-357. 2 tables. [5 refs.] [Authors' summary copied *verbatim*].

Toxins from 3 hemolytic strains of *Staphylococcus aureus* were inactivated by sulfanilamide *in vitro*. This was demonstrated by the survival of 92 of 630 mice injected intraäbdominally with the sulfanilamide-toxin mixture and the death of all 195 controls which received toxin only. The *in vivo* action of sulfanilamide, administered either before or subsequent to the toxin, was less marked.

The toxin of *Clostridium welchii* was likewise inactivated *in vitro* by sulphanilamide. Eighty-four per cent of 120 and 86% of 140 mice, injected intraäbdominally and intramuscularly, respectively, with the toxin-sulfanilamide mixture survived. *In vivo*, sulfanilamide protected 83% of 120 mice, when administered after the intraäbdominal injection of the toxin, and 90% of 120 mice, after intramuscular inoculation. Only 8% of 60 control mice, injected intraäbdominally, and 12% of 60 mice, injected intramuscularly, lived.

GOCHENOUR, W. S., STEIN, C. D., & OSTEEN, O. L. (1939). **Sulfanilamide in the Treatment of Equine Infectious Anemia.**—*Vet. Med.* **34.** 424-430. 3 tables, 2 graphs.

In doses of 15 g. twice daily until 450 g. had been given the drug was found to have no effect. Tests were then made to determine the effect of the drug on normal horses, and it was found that single doses of 50 or 75 g. produced no toxic action; it was estimated that to maintain a concentration of 10 mg.% in the blood, an initial dose of 75 g. and doses of 25 g. every 8 hours would be necessary, and that double these doses would be required to maintain a blood concentration of 20 mg.%. Large doses were administered to three affected horses, and this treatment was found to be without effect. As a result of the actions observed in these three horses the conclusion is drawn that to maintain a concentration of 20 mg.% and to avoid toxic action the total dose in the first 24 hours should not exceed 0·26 g. per lb. body weight.—W. J. IRONSIDE.

MANWELL, R. D., & GOLDSTEIN, F. (1939). **A New and Effective Method of Treating Canary-Pox.**—*Proc. Soc. exp. Biol., N.Y.* **41.** 554-555. [4 refs.]

The authors have treated the lesions of canary pox by local application of 1·5% and 3% alcoholic solutions of mercurochrome, and they consider that this drug will prove a specific. Out of 26 cases treated, only three died and they were advanced cases. Probable methods of infection under experimental and natural conditions are described.—S. G. IYER.

HAWKING, F. (1939). **Contribution on the Mode of Action of Germanin (Bayer 205).**—*Ann. trop. Med. Parasit.* **33.** 13-19. 3 tables. [12 refs.]

The minimum trypanocidal concentration of germanin, tested on suspensions of *T. rhodesiense* held at 37°C. for six hours, was found to be 5 mg. per ml., but if normal trypanosomes were exposed to a concentration of 0·1mg. per ml. for two hours or more, although they were still motile, they were found to have lost their infectivity. A germanin-resistant strain was not appreciably affected by a concentration of 1 mg. per ml.

It is suggested that germanin must sensitize the trypanosomes to the defence mechanism of the body. The results contrast strikingly with those obtained with trivalent arsenicals, as, in that case, if the trypanosomes are not killed they remain infective.

In work designed to estimate the amount of germanin absorbed by trypanosomes, little absorption could be detected by living trypanosomes of either the normal or resistant strains, but if death occurred some absorption took place. The method used for the detection of germanin was to boil 2 ml. of the fluid with 3 ml. of concentrated hydrochloric acid for six hours, then to make up the bulk with 10 ml. and decolorize with kaolin. Two ml. of the filtrate were treated successively with 1 drop of 0·5 % sodium nitrate, 2 drops of saturated urea, 3 ml. of 30 % sodium acetate and 1 ml. of 0·5 % mono-methyl-α-naphthylamine in 50 % acetic acid. A red colour developed, from the intensity of which the quantity of germanin present could be judged.—U. F. Richardson.

Levine, P. P. (1939). **The Effect of Sulfanilamide on the Course of Experimental Avian Coccidiosis.**—*Cornell Vet.* **29.** 309-320. 3 tables. [2 refs.]

Sulphanilamide is probably the only known drug which inhibits the development of five of the species of coccidia which inhabit the small intestine of fowls. The effects of treatment were assessed by recording the counts of oocysts passed in the faeces of treated birds. The drug was fed in capsules to birds of 1½ lbs. weight at the rate of 0·3 g. daily, or mixed with the mash in concentrations varying from 0·1-0·5 % body weight. The lower percentages of 0·1 % and 0·2 % had no effect on the production and discharge of oocysts of *Eimeria hagani* and *E. praecox*. Oocyst counts in treated birds increased after cessation of sulphanilamide feeding, but did not usually reach the values of those of untreated birds. As the feeding of therapeutic doses retards the normal weight gain of growing birds, and as such doses have no evident effect on the courses of *E. tenella* and *E. necatrix*, sulphanilamide treatment cannot be regarded as of any practical value. [It is possible that the sulphanilamide, in the form in which it was fed, never entered the caeca at all, in which case we are not sure whether or not *E. tenella* would be affected in the same way as the other species]. A description of a new and useful technique for oocyst counts is included in the paper.—C. Horton Smith.

Decourt, P., Belfort, J., & Schneider, J. (1939). Etude de l'action de l'oxy (diméthylaminobutyl amino) quinoléine sur *Plasmodium gallinaceum* et *Plasmodium falciparum*. [**The Action of Oxy(Dimethylaminobutyl Amino) Quinoline on** *P. gallinaceum* **and** *P. falciparum*].—*Bull. Soc. Path. exot.* **32.** 419-424. 2 tables. [7 refs.]

The drug under investigation is related chemically to plasmochin and has been given the name of " cilional ". It has been recommended by certain authors for the treatment of malaria, the claim being made that it acts particularly on the male gametocytes. The authors did not find it as effective as praequine or rhodoquine, when tested on *P. gallinaceum* infection in fowls and *P. falciparum* infection of man.—U. F. Richardson.

I. Kikuth, W. (1938). Die spezifische Behandlung der Piroplasmosen mit Acaprin. [**Specific Treatment of Piroplasmoses with Acaprin**].—*Vet.-med. Nach. Bayer-Meister Lucius*. Suppl. pp. 84-99. Numerous figs. on 3 plates. [Numerous refs.]

II. van Saceghem, R. (1938). Traitement de la theileriose due à Th. parva, par l'acaprine. [**Acaprin in the Treatment of Infections due to** *Th. parva*].—

Bull. agric. Congo belge. **29.** 143-144. 1 table. [Also appeared in *Ann. Soc. belge Méd. trop.* **18.** 343-345].

I. K. gives a general description of the various piroplasm infections of animals and the epidemiology of the diseases, and points out that in rare conditions only can dipping, or rotation of pastures be relied on for the eradication of ticks. He discusses the value of trypanblue and acriflavine in treatment, but considers that they are only effective in the case of a limited number of species of piroplasms, and points out that they both stain the flesh. He reviews the reports as to the efficacy of acaprin, and concludes that it is effective in all infections except *Theileria parva* infection. He emphasizes that, if given in large doses in the early stages of babesia infections, it may lead to sterilization of the animal, which leaves it susceptible to reinfection. This can be avoided by not using too large a dose. Attention is drawn to the symptoms of shock which may follow acaprin treatment. Such symptoms are not usually serious, and can be avoided by dividing the dose, and giving it in smaller quantities at intervals of two or three hours. Severe shock symptoms can be treated with " rephrin ". [Although acaprin has proved its value in the majority of babesia infections, opinions are still divided as to its value in the theileriases].

II. Four cattle from areas free from East Coast fever were placed on infected pastures and, after the onset of fever, were given acaprin subcutaneously in doses varying from 3-6 c.c. ; three of them died. Although animals infected as calves sometimes recover under acaprin treatment, the author considers that such recovery cannot be ascribed to acaprin, as calves are not as susceptible as adults.—U. F. R.

Ježić, J., & Kodrnja, E. (1937). Carboneum-tetrachloratum kao lijek protiv metiljavosti ovaca i koza. [**The Use of Carbon Tetrachloride against Fascioliasis of Sheep and Goats in Yugoslavia**].—*Arhiv. Minist. Poljopriv., Belgrade.* **4.** No. 6. 45-64. 6 tables. [7 refs.] [French summary].

A carbon tetrachloride preparation, " protumetilj ", in capsules, is used as an anthelmintic against liver fluke infestation of sheep and goats and has given good results; it is issued by the State Veterinary Experiment Station, Zagreb, Yugoslavia. The treatment is economical and is successful even in very serious cases.

—B. Oswald (Križevci).

Gordon, H. McL. (1939). **The Effect of Tobacco Licks Used for the Prevention of Trichostrongylosis in Sheep.**—*J. Coun. sci. industr. Res. Aust.* **12.** 104-108. 5 tables. [3 refs.]

This experiment is a trial of a proprietary tobacco lick of allegedly high nicotine content (about 10%). Thirty worm-free sheep were divided into three comparable groups on the basis of gains in body weight. All were then infected with *Trichostrongylus* spp. (mainly *T. colubriformis*). Group A (controls) had free access to coarse salt only, and Group B to a lick composed of six parts of coarse salt and one part of the proprietary preparation containing ground tobacco leaf and other unstated ingredients. Group C was treated by daily oral administration of 1 g. per head of the proprietary preparation plus free access to coarse salt. Egg counts were made from the 28th day after infection began. Mortality occurred in all groups indiscriminately.

The development of trichostrongylosis was not checked and this confirms previous unpublished observations that tobacco preparations as licks are of no value for this form of helminthiasis.—H. B. Carter.

Taylor, L. W., & DeOme, K. B. (1939). **Failure of Wheat Germ Oil to Prevent Lymphomatosis in Chickens.**—*J. Amer. vet. med. Ass.* **95.** 73-76. 2 tables. [11 refs.]

The nature of lymphomatosis lesions is described. No neoplasms occurred before ten weeks of age. Single comb White Leghorns were used in the experiments and the birds comprised lines, genetically different, bred for high and low incidence of neoplasms; birds representing reciprocal crosses were also included. The composition of the ration as fed to the birds is given. About 0·25% of wheat germ oil was incorporated in the mash. Although there was slight difference in the incidence of this disease between genetically different groups, it was not significant enough to warrant the use of wheat germ oil in the prevention of lymphomatosis.—S. G. Iyer.

Ulsø, H. (1939). Forsøg paa Behandling af Ufrugtbarhed hos Sølvraeve med gonadotropt Hormon. [**Treatment of Sterility in Silver Foxes by Gonadotropic Hormone**].—*Medlemsbl. danske Dyrlaegeforen.* **22.** 57-70. 2 tables.

After stating that frigidity in both sexes is one of the chief causes of sterility among silver foxes bred in captivity in Denmark, U. claims to have obtained promising results in 1938 in the treatment of the condition with a commercial gonadotropic hormone. The dose recommended for the females is 50 mouse units (m.u.), and should be repeated at intervals of 8-10 days, until mating takes place; the dose for the males is from 100-150 m.u. of the preparation.

Pfeiffer, K. (1937). Versuche über die therapeutische Beeinflussung des Lungenödems bei phosgenvergifteten Hunden mittels intravenöser Injektion von Traubenzuckerlösung. [**Therapeutic Action of Intravenous Injections of Dextrose on Pulmonary Oedema of Dogs Poisoned by Phosgene**].—*Inaug. Diss., Hanover.* pp. 55. 4 tables. [Numerous refs.]

P. states that the results of his experiments on a total of 47 dogs of various breeds, which had been exposed to high concentrations of phosgene for 30 minutes, clearly demonstrated the curative effect, on the pulmonary oedema caused by the gas, of intravenous injections of 50 c.c. of a 20% dextrose solution, at body temperature. The largest number of recoveries is stated to have occurred in the animals which received four injections at the 3rd, 4th, 5th, and 6th hours after they had been gassed; the effect of four injections at the 12th, 13th, 14th, and 15th hours was only slightly less favourable.

Hübner, K. (1939). Die therapeutische Beeinflussung von Gelbkreuz-Hautschäden durch Antivirus nach Besredka. [**Treatment with Besredka's Antivirus of Skin Lesions Due to Mustard Gas**].—*Inaug. Diss., Berlin.* pp. 45. [Numerous refs.]

Details are given of experiments on six horses, the results of which are claimed to have shown that Besredka's streptococcus antivirus did not cure the skin lesions experimentally produced by mustard gas, even though in the first stages of the treatment it hastened the suppurative separation of the necrotic areas from the healthy tissue.

POISONS AND POISONING

Ferguson, J. (1939). **The Use of Chemical Potentials as Indices of Toxicity.**—*Proc. roy. Soc.* Ser. B. **127.** 387-404. 2 figs., 7 tables. [Num. refs.] [Author's summary copied *verbatim*].

From a review of published data it is concluded that two main classes of toxic action exist. In one case the effects are due to chemical reaction. In the other a physical mechanism is at work. Criteria are given whereby the two classes of toxic action may be distinguished. All substances can exert physiological effects by a physical mechanism though the physical action may be, and frequently is, marked by a specific chemical reaction.

Physiological effects due to a physical mechanism are generally measured when an equilibrium has been established between the concentration of the toxic substance in the phase, solution or vapour, in which it is applied and the concentration in the phase or surface layer which is the seat of toxic action. Since the chemical potential of the toxic substance must be the same in all phases partaking in the equilibrium, it is suggested that the toxicities of physically toxic substances should be compared, not by the values of the toxic concentration in the external solution or vapour, but by the values of the chemical potentials in these phases. Chemical potentials so determined are identical with the chemical potentials at the actual point of attack within the organism. By this procedure the disturbing effect of phase distribution is eliminated from the comparison of toxicities.

Using the activity function of G. N. Lewis as the chemical potential, it is found that, when chemical reaction is absent, though diverse chemical compounds exert the same toxic effect on a given organism at widely different concentrations, the activities corresponding to these concentrations lie within a relatively narrow range. The differences in activity within this range are ascribed to the effect of chemical constitution.

Smith, M. I. (1939). **The Influence of Diet on the Chronic Toxicity of Selenium.**—*Publ. Hlth Rep., Wash.* **54.** 1441-1453. 4 figs. on 2 plates, 3 charts. [13 refs.] [Author's summary copied *verbatim*].

Experiments made on rats show that the toxicity of naturally occurring food selenium is largely determined by dietary factors. A level of intake of selenium which is highly toxic and tissue-damaging when fed in a diet of low protein and high carbohydrate content is only slightly harmful, if at all, when fed in a diet of high protein and low carbohydrate content. The same level of selenium intake in a low protein and high fat diet causes stunted growth and extensive loss of hair, but no other demonstrable tissue damage except some fatty degeneration of the polygonal cells of the liver. Such animals are quickly restored to a normal condition when returned to a balanced non-seleniferous diet.

All the available evidence indicates that the effects and toxicity of naturally occurring food selenium are determined within certain limits not so much by the level of intake as hitherto supposed, as by the protein-selenium ratio in the diet. At a level of 10 parts per million of selenium, a ratio of 1 per cent of protein in the diet to about 30 micrograms or less of selenium per 100 grams of diet is of little, if any, toxicity. A ratio of 1 per cent protein to 100 micrograms of selenium per 100 grams of diet under the same conditions is dangerously toxic.

Whether the quality as well as the quantity of protein in the diet plays a role in determining the toxicity of selenium is not known at present. This and many other questions will have to be worked out in the future.

Ohman, A. F. S. (1939). **Poisoning of Cattle by Saline Bore Water.**—*Aust. vet. J.* **15.** 37-38. [2 refs.]

The consumption of saline bore water resulted in a serious loss of cattle in the Millmerran district (Darling Downs). At the head of the bore the water contained 612·6 grains of chlorine per gallon (1,009 grains per gallon calculated as NaCl).

Symptoms shown by affected animals included nasal discharge, paresis and knuckling over, scouring, a mucous discharge in some faecal samples and rapid loss in condition. P.M. changes were not marked. The abomasum and small intestines were slightly inflamed and showed a few petechiae.—M. C. FRANKLIN.

NICOLAUS, W. (1939). Zur Frage der Entstehung der toxischen Leberdystrophie bei Schweinen infolge Lebertranfütterung. Teil III. Fütterungsversuche mit Lebertranemulsionen an Ferkeln. [**Feeding with Cod Liver Oil. III. Experiments with Cod Liver Oil Emulsion in Piglets**].—*Tierärztl. Rdsch.* **45.** 133-136. [See also *V. B.* **8.** 606].

This is a summarized account of feeding experiments with 76 piglets, the results of which are stated to have shown again that highly bred, fast fattening breeds (*e.g.* the German white "Edel" thoroughbred pig) are much more prone to develop toxic liver dystrophy as a result of the administration of cod liver oil emulsion, than the more common, sturdier races, of a coarser habit. This susceptibility appears to be a heritable factor, particularly transmissible by the male parent. Further inferences from the experiments are stated to have been that the development of the toxic symptoms is favoured by any means tending to lower the glycogen content of the liver, such as the administration of thyroxin or insulin, or periods of fasting; it is apparently independent of the sex of the piglets, the presence of *Clostridium welchii* in their intestinal flora, the composition and age of the cod liver oil emulsion, or the composition of general alimentary diet. In the experiments the toxic symptoms developed only in piglets weighing from 5·7-35 kg. live weight.

STEYN, D. G., & BEKKER, P. M. (1938). **The Toxicity of Some Dipping Fluids Containing Arsenic and Sulphur.**—*Onderstepoort J. vet. Sci.* **11.** 247-255. 4 tables. [1 ref.]

Various arsenical dipping fluids are in common use in South Africa and accidental poisoning from their use is not infrequent. Sodium arsenite may be used alone or in the form of a dipping powder such as Cooper's ordinary dip or the double dipping powder. The ordinary powder appeared to be about 2½ times as toxic as the double one when dosed to rabbits *per os*.

Sulphur-containing dips such as "Capex" are extensively used for the eradication of scab in sheep and goats. The M.L.D. for the rabbit of the undiluted dipping fluid was 1·5 c.c. per kg. body weight and 800-1,000 c.c. for a full grown sheep.

In dipping strength concentration, "Tarzan" lime sulphur dip and Nelson's sodium polysulphide dip have about the same toxicity as "Capex" lime sulphur dip.—E. M. ROBINSON.

PULLAR, E. M. (1939). **Studies on Five Suspected Poisonous Plants.**—*Aust. vet. J.* **15.** 19-23. 1 table. [9 refs.]

Field observations and feeding experiments have clearly demonstrated the toxicity of *Anagallis arvensis* (scarlet pimpernel) for sheep. The toxic principle remains undetermined, but it is concluded that the amount present varies enormously from time to time, and that the plant is toxic only for limited periods under certain as yet unknown conditions.

Maclura aurantica Nuttall (osage orange) is an ornamental tree and not a plant to which sheep often have access. The green and partly dried leaves are toxic to sheep, but the toxic principle is apparently destroyed by desiccation.

Neither of the above plants appears to contain cyanogenetic substances.

Euphorbia lathyrus L. (caper spurge) was shown by a feeding experiment to be capable of producing gastro-intestinal irritation in sheep, but no lethal toxin was demonstrated.

Helichrysum blandowskiamum Steetz (woolly everlasting) and *Solanum nigrum* L. (black nightshade) gave only negative results in feeding experiments.—H. B. C.

Fleming, C. E., Miller, M. R., Vawter, L. R., & Young, A. (1938). **Poisonous Range Plants.**—*Rep. Nev. agric. Exp. Sta. 1936-37.* pp. 23-24.

Mysterious deaths of sheep on certain Nevada ranges during the year were shown to be due to acute poisoning by *Astragalus speirocarpus.* An attempt was made to verify the conclusion previously reached that swellhead in sheep is caused by *Tetradymia glabrata.* Analyses were made of the alkaloids of *Lupinus confertus* and *Corydalis caseana.* Progress was made in the analysis of selenium, which occurs in many western soils and imparts poisonous properties to plants in such soils.

Legg, J., & White, C. T. (1939). *Hoya australis*: **a Plant Poisonous to Stock.** —*Aust. vet. J.* **15.** 34-36. [1 ref.]

Hoya australis, commonly known as "hoya" and sometimes as "wax flower", is widely distributed in Queensland, northern New South Wales, and the islands of the South Pacific. Its leaves are very poisonous to sheep, 0·75 lb. producing symptoms within 24 hours, and 1 lb. causing death in a little over 24 hours. The chief symptoms are "pirouetting" of the eyes and extension of the limbs when the animal is down. Macroscopic lesions are almost entirely absent.—H. B. Carter.

I. Bradley, W. B., Beath, O. A., & Eppson, H. F. (1939). **Oat Hay Poisoning [in Cattle].**—*Science.* **89.** 365. [2 refs.]

II. Bradley, W. B., Eppson, H. F., & Beath, O. A. (1939). **Nitrate as the Cause of Oat Hay Poisoning.**—*J. Amer. vet. med. Ass.* **94.** 541-542. [2 refs.]

I. Periodic deaths in cattle consuming oat hay in Eastern Wyoming have been reported since 1934. Experimentally it was found that 11 lbs. of such hay would kill a 350-lb. steer in about nine hours, and that water extracts of the hay would induce symptoms of asphyxia characteristic of the disease. Methaemoglobin was found in the blood under these conditions; this explains the symptoms of asphyxia and of abortion in pregnant cattle eating sublethal amounts of the hay. The active principle is water soluble and heat stable but does not appear to be HCN as was first thought.

II. Further investigation of the toxic principle of this oat hay showed that it was KNO_3, present in the hay in quantities of from 3·2% to 7·2%. Experimentally it was found that such quantities of KNO_3 as occur in 15 lbs. of hay caused death in two calves with symptoms of asphyxia including methaemoglobinaemia. Sheep are similarly affected, but without methaemoglobinaemia, and die directly from the effects of nitrate poisoning. In cattle, it is suggested that the nitrate is reduced to nitrite in the alimentary tract and that the nitrite is the cause of the production of methaemoglobin.—Alfred Eden.

Urbain, A., & Nouvel, J. (1939). Cas d'intoxication alimentaire dus à l'ivraie observés chez des animaux sauvages en captivité. **[Rye Grass Poisoning in Wild Animals in Captivity].**—*Bull. Acad. vét. Fr.* **12.** 77-82. [5 refs.]

Cases of poisoning at a zoological park involving various captive wild animals (reindeer, addax, gazelle) were traced to the grain fed. Symptoms included vertigo, disinclination to move, lassitude and visual derangement, followed later

by localized muscular tremblings, becoming more acute and more generalized. Examination of the oats fed showed the presence of impurities, including up to 5% of a species of rye grass seeds (*Lolium temulentum* as opposed to *L. perenne*, the ordinary rye grass) readily identifiable by their botanical structure and the microscopic appearance of their starch granules. Confirmation of the toxic nature of the grass mixture was obtained after feeding it to g. pigs, white mice and ordinary domestic mice, which all presented the above symptoms and the characteristic P.M. lesions of cerebral congestion. The toxicity of the grains was found not to be affected by germination, but birds appeared to be less susceptible than mammals to the toxic principles, one of which is ether-soluble and the other soluble in water. —Alfred Eden.

Boughton, I. B., & Hardy, W. T. (1939). **Toxicity of the Coffee Bean (Sesbania Vesicaria) for Sheep.**—*J. Amer. vet. med. Ass.* **95.** 239-241. 1 table. [4 refs.]

The occurrence is described of a fatal outbreak of poisoning in a flock of sheep after ingestion of the ripe seeds of *S.v.* (= *Daubentonia*) which is known as the coffee bean. [This is not the plant from which coffee is obtained].

The illness, which was characterized by profuse diarrhoea and intense abdominal pain, led to an investigation into the toxicity of these seeds in sheep. Five sheep were fed various amounts of the seeds and the M.L.D. was found to be between ·03125 and ·0625% of the live weight. Symptoms included uneasiness, depression, diuresis, anorexia, diarrhoea, shallow rapid respirations, irregular fast pulse and subnormal temperature, the animals eventually dying in coma. The P.M. appearance, described in full, included gastro-enteritis and congestion of the spleen, liver and kidneys. Two lambs receiving smaller doses presented milder symptoms and recovered after sixteen days illness.—Alfred Eden.

Mettam, R. W. M. (1939). **Poisoning by Phytolacca dodecandra l'Herit.—Family : Phytolaccaceae.**—*Vet. J.* **95.** 135-138. [6 refs.]

The toxicity for sheep of *Phytolacca dodecandra* of East Africa (= *P. americana*) was investigated. The fresh leaves produced no toxic symptoms, but a subcutaneous inoculation of a tincture made from the fresh leaves caused symptoms of depression, hiccoughs, trembling of the main muscle groups, diuresis and a slight foetid, olive green diarrhoea in a sheep which recovered three days later. The bark and root appeared to be much more toxic, and a small dose of an aqueous extract inoculated into a sheep caused symptoms of distress, rapid shallow respirations and a bloody diarrhoea, terminating in death within six hours. P.M. examination showed a per-acute gastro-enteritis, congested and oedematous lungs, and congestion of the spleen, liver and kidneys. The berries of the plant were fed to sheep, causing mild gastro-enteritis in one and no symptoms in the other. Although little information is available as to naturally-occurring poisoning in domesticated animals by this plant, its toxic nature should be considered in cases of sudden death preceded by violent gastro-intestinal symptoms.—Alfred Eden.

PHYSIOLOGY

Muto, K. (1937). Zur Kenntnis der Basalmembran. **[The Structure of the Basement Membrane].**—*Virchows Arch.* **300.** 652-669. 4 figs. [Numerous refs.] [Abst. in *Arch. Path.* **27.** 784-785. copied *verbatim*. Signed O. T. Schultz].

Muto defines basement membrane as the homogeneous layer which divides connective tissue externally from epithelium and internally from capillaries and

muscles. Whether the membrane is fibrillary or homogeneous is controversial. Muto's observations are based on the use of various staining methods, especially the silver impregnation methods. He conceives the basement membrane to be composed of argentophilic fibrils embedded in a ground substance. The latter may be in the sol state ; then it is not visible by any method and may appear as a space in the tissue. Or it may be in the gel state, in which event it is stainable and appears homogeneous or sometimes granular. The size, shape, arrangement and staining properties of the fibrils are not uniform. New formation of the basement membrane was observed in epithelial hyperplasia, both benign and malignant. This may occur by actual new formation of ground substance and fibrils or by rearrangement of the fibrils previously present. Transformation of the membrane may be localized and lacunar. This state may be brought about by liquefaction of the ground substance and rearrangement of the fibrils or by localized disappearance of portions of fibrils and liquefaction of the ground substance. Diffuse transformation of the basement membrane is the result of deposition in the ground substance of amyloid, hyalin or fat.

Wirth, D. (1939). Die besondere Reaktionsweise der hämatopoetischen Organsysteme bei unseren Haussäugetierarten. [**Types of Haemopoietic Reaction in Domestic Mammals**].—*Rep. 13th int. vet. Congr. 1938.* **1.** 273-281. [In German : English, French and Italian summaries. Discussion p. 282 in German].

W. has studied the blood picture in domestic animals following the loss by venesection or heart puncture of approximately one half of the estimated blood volume. Blood films were examined on a number of occasions prior to bleeding and then daily for three or four weeks. Cell counts were also made during the same period.

In the horse the reaction is characterized by the scarcity of immature red cells in the circulating blood ; reticulocytes and punctate basophilia are not seen and the other regenerative forms are found only in small numbers. In the other species of domestic animals a very high proportion of regenerative cell forms occurs.

In the dog and cat red cells showing punctate basophilia are rare, but erythroblasts and Jolly bodies are numerous. On the other hand, in the sheep and goat, punctate basophilia is a conspicuous feature while Jolly bodies and erythroblasts are scarce. The reaction in the pig differs from that in the dog and cat in that erythroblasts are less common. Investigations in cattle were not then complete.

In the discussion which followed the paper, Hjärre expressed the view that the difference in the blood picture following haemorrhage in the horse and dog was due to a difference in the regenerative ability of the bone-marrow. In the horse the regenerative ability of the haemopoietic system is so great that even severe haemorrhage fails appreciably to influence the blood picture ; in the dog, the less efficient mechanism (the haemopoietic tissue was estimated to be only one third of that in the horse) is reflected in the appearance of large numbers of immature cells in the circulating blood. Sternal puncture in the horse showed 60 % of erythropoietic cells ; the corresponding value for the dog was only 20 %.

—E. G. White.

Kennedy, W. L., Anderson, A. K., Bechdel, S. I., & Shigley, J. F. (1939). **Studies on the Composition of Bovine Blood as Influenced by Gestation, Lactation and Age.**—*J. Dairy Sci.* **22.** 251-260. 3 figs. [Numerous refs.]

The blood of 5 heifers and 5 cows, which had just dropped their calves, when analysed at weekly intervals, was found to be little affected by gestation and lactation

as regards non-protein nitrogen, glucose, calcium and phosphorus content. The average values were 32·82 mg., 52·12 mg., 10·91 mg. and 5·44 mg. respectively per 100 c.c. of blood. Blood from calves less than a week old contained 125 mg. of glucose per 100 c.c. but at the end of a year the amount had decreased to 54·4 mg. per 100 c.c. of blood. This represents the convulsive level in human beings. The glucose content of calves' blood varies during the day and increases after feeding on milk. Calves appear to be less able to metabolize glucose than older animals. —H. V. Hughes.

Duncan, C. W., Lightfoot, C. C., & Huffman, C. F. (1938). **Studies on the Composition of Bovine Blood. 1. The Magnesium Content of the Blood Plasma of the Normal Dairy Calf.**—*J. Dairy Sci.* **21.** 689-696. 2 figs., 1 table. [12 refs.]

Determinations of Mg in the blood plasma of 107 normal dairy calves (47 males and 60 females) were carried out by examining samples taken weekly or bi-weekly during the first 18 months of life. The average number of samples taken from each calf was 21. The mean Mg values showed fairly close agreement from month to month with a tendency to increase up to 12-13 months of age. The mean value for all observed values was 2·414 mg. per 100 c.c. of blood plasma.

The data for each sex were analysed and no significant differences were noted for the period under consideration. All male calves were removed from the investigation by the time they were six months old.

The authors suggest that fluctuations in the Mg content of the blood of growing dairy calves is a normal occurrence.—H. V. Hughes.

Schwarte, L. H. (1939). **The Hemoglobin Content of the Blood of Pigs.**—*Vet. Med.* **34.** 300-304. 6 charts. [6 refs.]

S. describes his observations on the haemoglobin content of the blood of pigs from birth to six months old. He finds that litters farrowed and raised under housed conditions have a much lower haemoglobin content than those farrowed and raised in the open field, but when the housed litters are themselves placed in the open field the haemoglobin contents become approximately equal.

He has found, however, that the haemoglobin content is very variable, and that very low figures can be obtained from normal animals due to physiological and not pathological causes ; he therefore considers that a diagnosis of a pathological condition such as anaemia based on the blood picture alone is not to be recommended.—H. V. Hughes.

Jespersen, J., & Olsen, N. J. H. (1939). Undersøgelser over Haemoglobinindholdet i Grisenes Blod. **[Haemoglobin Content of the Blood of Pigs].**—*Beretn. Forsøgslab., Kbh.* No. 182. pp. 64. 13 figs, 24 tables. [French and German summaries].

The authors state that the results of work from 1930 to 1938, involving a total of some 20,000 individual investigations by Sahli's method, indicated that while the level of the haemoglobin content of the blood of piglets at birth is essentially determined by heredity, it is subject to very considerable individual variations, even among the piglets of the same litter. There was evidence that the course of the fluctuations in the haemoglobin content in the growing piglets is greatly influenced by seasonal and other environmental conditions. High haemoglobin content at the age of 8 weeks was correlated with low mortality and high resistance of the piglets to infectious diseases, and also with greater thriftiness.

Well-balanced nutrition of the pregnant sows and of the piglets after birth are important factors in the maintenance of a normal haemoglobin content of piglets.

HOUCHIN, O. B., GRAHAM, W. R., Jr., PETERSON, V. E., & TURNER, C. W. (1939). **The Chemical Composition of the Blood of the Dairy Goat.**—*J. Dairy Sci.* **22.** 241-250. 3 tables. [Numerous refs.]

The article gives the results of tests carried out to determine several of the constituents of blood and plasma in the goat. A comparison between arterial and venous blood in the lactating and non-lactating goat was made. For most constituents the goat is intermediate in value compared with human beings, horses, cattle, sheep, pigs, dogs, cats, rabbits and hens. The cell volume and haemoglobin value are much lower in the goat, perhaps due to the small size of the red corpuscle. In amino-acid and inorganic phosphorus the goat blood shows a higher value than that of any other animal tested.—H. V. HUGHES.

FISCHER, M. H., & SUER, W. J. (1939). **Base-Protein-Acid Compounds Prepared from Fibrin.**—*Arch. Path.* **27.** 811-814. 1 fig. [3 refs.] [Authors' summary copied *verbatim*].

Base-protein-acid compounds have been produced from fibrin. Their "behaviour" towards water, salts, acids and alkalis is described. It parallels qualitatively and quantitatively the reaction of living cells to like changes in surroundings.

BRINKHOUS, K. M., SMITH, H. P., WARNER, E. D., & SEEGERS, W. H. (1939). **The Inhibition of Blood Clotting : an Unidentified Substance which Acts in Conjunction with Heparin to Prevent the Conversion of Prothrombin into Thrombin.**—*Amer. J. Physiol.* **125.** 683-687. 2 tables. [7 refs.] [Authors' summary copied *verbatim*.]

The effect of heparin in blocking the conversion of prothrombin into thrombin requires the presence in plasma of an accessory inhibitory factor not previously recognized. Heparin alone does not block the formation of thrombin and the new factor alone has very little inhibitory power. However, the two together are highly effective in doing so. The new plasma factor is shown to be non-dializable but, aside from this, its identity has not yet been established.

GREGERSEN, M. I., & PAINTER, Elizabeth. (1939). **Plasma Volume and "Available Fluid" Changes in Dehydration.**—[Original copied *verbatim* from *Amer. J. Physiol.* **126.** P511-P512].

Dehydration (8-19% loss in body weight) was produced in dogs by water deprivation and by intravenous injection of hypertonic (50%) sucrose. The changes in plasma volume, in fluid available for solution of sodium thiocyanate and (in some experiments) in the water available for solution of sulfanilamide were measured with methods described previously (GREGERSEN et al, 1935-39 ; PAINTER, 1938). In 14 experiments on water deprivation the average decrease in plasma volume was 26% (17-41) and in the "available fluid" 17% (8-28). Changes of similar magnitude were observed in animals dehydrated with sucrose diuresis. According to the results of experiments in which we attempted to determine total body water (sulfanilamide) as well as "available fluid", the fluid lost in dehydration is drawn from both the extra- and intracellular compartments.

Rich, A. R., Wintrobe, M. M., & Lewis, Margaret R. (1939). **The Difference of Myeloblasts from Lymphoblasts by their Manner of Locomotion. A Motion Picture Study of the Cells of Normal Bone Marrow and Lymph Nodes, and of Leukemic Blood.**—*Johns Hopk. Hosp. Bull.* **65.** 291-308. 38 figs. on 3 plates. [14 refs.] [Authors' summary copied *verbatim*].

In this study, the behaviour of lymphoblasts from normal lymph nodes and from the blood of cases of lymphoid leukemia has been compared by means of motion pictures with that of myeloblasts from normal bone marrow and from the blood of cases of myeloid leukemia. The comparison has revealed a striking difference between the manner of locomotion of lymphoblasts and that of myeloblasts. These observations provide a new type of evidence against the " unitarian " interpretation of blood formation which assumes, on the basis of the appearance of the cells in stained preparations, that lymphoblasts and myeloblasts are identical.

The manner of locomotion of the mononuclear phagocyte (" monocyte " ; " histiocyte ") has conformed to that described for this cell by other observers, and in this study has been found to be entirely different from that of either the lymphoblast or the myeloblast.

Rich, A. R., Lewis, Margaret R., & Wintrobe, M. M. (1939). **The Activity of the Lymphocyte in the Body's Reaction to Foreign Protein, as Established by the Identification of the Acute Splenic Tumor Cell.**—*Johns Hopk. Hosp. Bull.* **65.** 311-326. 25 figs. on 3 plates. [Numerous refs.] [Authors' summary copied *verbatim*].

1. Infection is not necessary for the occurrence of acute splenic tumor. This condition represents a reaction to the parenteral presence of foreign protein, whether bacterial or non-bacterial.

2. Lymphoblasts, myeloblasts and histiocytes (monocytes) can be distinguished from each other by their type of locomotion. Motion picture study of the large, basophilic, mononuclear acute splenic tumor cells in comparison with lymphoblasts, myeloblasts and histiocytes (monocytes) shows that the type of locomotion of the acute splenic tumour cell is precisely like that of the lymphoblast, and quite different from that of the myeloblast or the histiocyte (monocyte). It is therefore concluded that the large basophilic mononuclear cells which proliferate in the spleen in acute splenic tumour are lymphoid in character.

3. Lymph nodes draining infected tissues or a site into which foreign protein has been injected, exhibit a lymphoid cell proliferation entirely like that characteristic of acute splenic tumor.

4. Since the present studies identify as lymphoid, cells which proliferate so promptly following the parenteral injection of foreign protein, it is concluded that one function of the lymphocyte is concerned in some way with the body's reaction to foreign protein.

Wester, J. (1938). Neuere Untersuchungen über die Physiologie der Vormägen der Wiederkäuer. [**Recent Investigations on the Fore Stomach of Ruminants**].—*Rep. 13th int. vet. Congr. 1938.* **2.** 1321-1335. [Numerous refs.] [In German : English, French and Italian summaries. Discussion pp. 1342-1343 in English and German].

The previous work of the author is summarized [(1926). *Die Physiologie und Pathologie der Vormägen beim Rinde.* Berlin : Schoetz]. The reticulum contracts twice every 40-60 seconds while rumination is not in progress, and a wave of contraction passes over the omasum and backwards over the rumen ; this takes the form of a wave of peristalsis followed by a wave of antiperistalsis. During rumina-

tion the reticulum contracts three times a minute. Regurgitation occurs (while the rumen is quiescent) with no increase of abdominal pressure, ingesta being sucked into the oesophagus. It has been suggested that the oesophagus is mainly responsible for this sucking action ; another theory is that this action is caused by the fall in pressure in the thorax, due to an inspiratory effort with a closed glottis, or else that this assists the occurrence of the fall of pressure in the oesophagus and consequently the entry of food.

In young calves any fluid taken by the mouth passes to the abomasum by the closure of the lips of the oesophageal groove. This is stated to be due to reflex action, the stimulus being " agitation " of the pharynx. As the calf gets older this reflex is gradually lost, at first to water and later to milk. Some chemical substances, especially sodium salts in the case of the cow and copper sulphate in the case of the sheep, will stimulate the reflex even in the adult. There is evidence that drugs, such as pilocarpine, atropine and chloral hydrate, can be absorbed in the fore stomachs ; whether any of the breakdown products of the food stuffs are absorbed here is unknown.

In the discussion the importance of the alternate contraction and relaxation of the reticulum, and anterior blind sac of the rumen (Schleudermagen) and the alternate contraction and relaxation of the two posterior blind sacs of the rumen was emphasized. The opinion that peristaltic and antiperistaltic waves form the major movements of the fore stomachs was strongly contested.—A. T. P.

Sym, E. A. (1938). Die enzymatische Wirkung des Panseninhaltes. [**Enzyme Action of the Contents of the Rumen**].—*Rep. 13th int. vet. Congr. 1938.* **2.** 1336-1342. [1 ref.] [In German : English, French and Italian summaries. Discussion pp. 1342-1343 in English and German].

The proteolytic, amylolytic and lipolytic activity of rumen contents from slaughtered cattle was examined. The material was divided into 5 fractions ; the solid and liquid fractions were separated by sieving, and the liquid was centrifuged and then filtered through a porcelain candle, the centrifuged deposit, rich in infusoria, forming one fraction.

The proteolytic activity was strongest in whole rumen contents and decreased in the following order in the fractions :– the infusoria-rich deposit, the solid fraction (watery extract), the liquid, the centrifuged liquid and the filtrate, the latter having only a very weak activity. The optimum pH was 7·2. The amylolytic activity was distributed in the same order with the exception that the infusoria-rich fraction produced sugars in contrast to the bacteria-rich fraction (the centrifugate) which produced dextrin. The optimum pH was 6·0. The lipolytic activity was very variable ; rumen content from cattle fed on green food was usually more active than that of cattle fed on hay and chaff. The solid fraction contained lipase, the liquid fraction less, while the centrifuged and filtered liquids contained none.

The activity of bacteria, and also of infusoria, in the predigestion processes in the rumen was referred to in the discussion.—A. T. Phillipson.

Morris, S., & Ray, S. C. (1939). **The Fasting Metabolism of Ruminants.**—*Biochem. J.* **33.** 1217-1230. 9 tables. [Numerous refs.]

Studies were made upon the fasting catabolism of two lactating and two non-lactating goats, of four non-lactating sheep, and of three lactating cows. Daily urinary N excretions expressed on a kg. live weight basis were 60-80 mg. for cows, 120-200 mg. for goats and 120-160 mg. for sheep, and the daily faecal output was 6·6 g., 0·35 g., and 0·49 to 0·80 g. for cows, goats and sheep respectively. Urinary

studies showed that there was a tendency for the preformed creatinine to diminish slightly during the fast and for the creatine to rise markedly, whilst investigations into the purine metabolism showed that the output of uric acid and allantoin was lowered, and that of purine base was increased. Various blood fractions were also studied; both the protein and the non-protein N fractions showed an increase. The slight increase in the protein could be explained on the grounds of slight dehydration of the blood, but that of the N.P.N., due chiefly to an increase of the undetermined N fraction, could not thus be accounted for. The blood uric acid also showed a significant rise. Urinary Ca decreased markedly during the fasting, practically disappearing, and the faecal Ca also fell, although with goats the amount of Ca per g. dry faeces rose. Previous statements that fasting causes an osseous catabolism in ruminants did not find the slightest confirmation in these studies, even when the fast was allowed to go on for 12 days.—ALFRED EDEN.

RICHARDS, A. N. (1938). **Processes of Urine Formation.**—*Proc. roy. Soc.* Ser. B. **126.** 398-432. 21 figs. [Numerous refs.]

Much of the subject matter of this article, the 1938 Croonian lecture, delivered before the Royal Society, derives from work carried out at the Laboratory of Pharmacology of the University of Pennsylvania. The history of the knowledge of the structure of the kidney is traced from BELLINI (1662) to BOWMAN (1842) who on the basis of new anatomical findings proposed a theory of urine secretion, namely that urine was a special secretion of the membrane of the uriniferous tubules. LUDWIG shortly afterwards stated that urine was a filtrate and brought forward his filtration-reabsorption theory. Experimental work during the late 19th and early 20th centuries brought to light new evidence which in turn supported each of these theories. Work with which R. had been associated for over twenty years was begun to decide which was correct and to meet objections to the older experimental work. He and PLANT (1922) established conclusively that increased arterial pressure to the kidney led to an increased urine flow. Later it was found possible to collect the secretion of distinct glomeruli in the kidneys of various amphibia, and qualitative analysis showed support of the filtration theory, the most significant fact being the presence of sugar and chloride in the glomerular filtrate in contrast to their absence from the urine. These substances thus escape through the glomerulus, to be returned to the blood stream by the tubules. By the use of inulin, the pore size in the glomerular membrane was found to be much larger than that of the molecules of any of the normal diffusible solutes of the plasma, showing that the diffusion was purely a physical and not a vital process and that simple filtration is the sole process involved. Other experiments showed that the volume of the glomerular filtrate in any one kidney was from 8-15 times greater than the volume of excreted urine. By special technique it was possible to collect tubular filtrate in amphibia and to provide proof of the reabsorption side of the theory. The action of phloridzin in preventing reabsorption of glucose from the glomerular filtrate was confined to the proximal convoluted segment. Arguments against conclusions being drawn for mammalian from amphibian physiology are disposed of, largely by experimental evidence derived from injection of such varied molecules as inulin, egg and horse-serum albumin. Altogether the truth of the filtration-reabsorption theory has been shown for amphibia, and sound arguments are advanced for the belief that urine secretion occurs similarly in man and the higher mammals. Urine formation is thus believed to consist in the separation from blood of an undifferentiated filtrate by a blind physical action, and the restoration of large quantities of glucose, amino-acids and salts to the blood by fine selective processes of absorption depending on the cells of the tubules, which must

also have secreting capacities for the excretion of foreign substances. The normal function of the kidney in the words of the author consists of largely " salvaging to the organism those constituents of the glomerular filtrate whose loss would entail irretrievable damage."—ALFRED EDEN.

I. SIMONNET, H. (1938). Physiologie des glandes mammaires. Etude des facteurs modificateurs extrinsèques. [**Extrinsic Factors in the Physiology of the Mammary Gland**].—*Rep. 13th int. vet. Congr. 1938.* **2.** 1282-1293. [Numerous refs.] [In French : English, German and Italian summaries].

II. VAĆEK, T. (1938). **The Nervous and the Hormonal Regulation of the Mammary Gland.**—*Ibid.* 1294-1301. [In English : French, German and Italian summaries].

III. NICHITA, G. (1938). Etude de la sécrétion du lait. [**Study on Milk Secretion**].—*Ibid.* 1303-1319. [Numerous refs.] [In French : English, German and Italian summaries].

I. Extrinsic factors exerting an influence on the physiology of the mammary gland include nutrition, climate and the effect of milking. In nutrition, the effects of water, carbohydrates, proteins, lipides, minerals and vitamins, so-called galactogogues and substances which can pass directly into the milk are considered. Milk represents the partially autolysed product of the tissue formed by the development of the mammary epithelium and from this point of view S. shows that nutrition plays a part in milk secretion analogous to that which it plays in the building up of other tissues; that is, it can limit the production of milk, but cannot increase it above the proliferative capacity of the epithelium. The influence of food upon composition of milk is very small even in the case of substances such as vitamins which are not actually formed by animal organisms. The effect of climate is considered, there being an optimum temperature and degree of humidity for milk production. Light also has a profound influence upon the vitamin content of milk, in particular vitamin D, the increased content of which in milk during summer is attributed solely to sunlight. Milking is also very important since a fundamental factor in the persistence of milk secretion, in its quality and quantity, is the regular removal of the secreted product, a removal which is not spontaneous. How this factor operates is obscure ; intra-mammary pressure undoubtedly plays a part and apparently a nervous hormone regulation is also involved.

II. There are two types of regulation of the mammary gland ; the growth, development and preparation of the gland for secretion (morphogenetic) are principally under the control of the endocrine system, while the mechanism of secretion (functional) is under nervous control. The known endocrine glands exciting governing influences are, in particular, the ovaries, the placenta and the anterior pituitary, although most of the other glands may also play a direct or an indirect role in the functional regulation of the mammary gland. All these effects are closely interrelated. Specific hormones playing important parts are oestrone, progesterone, and the gonadotropic hormone of the anterior pituitary as well as the lactogenic prolactin, but the secretion of the thyroid, adrenals and the posterior pituitary may also collaborate. Little is said of the direct nervous regulation of the gland, principally affecting secretion, but this regulation probably acts in direct collaboration with the endocrine system and possibly through it. Certain vitamins in addition have an influence which although not regulatory is nevertheless indispensable to a normal functional state of the mammary gland, and a so-called vitamin L is said to have an influence on milk secretion, although little is said about it. Any vitamin deficiency affecting the sexual endocrine complex has a

secondary effect upon the mammary gland ; this applies particularly to avitaminosis E, which affects the anterior pituitary, although so far this work has not been completed.

III. N. summarizes some of the more recent findings of the morphology and histology of the mammary gland, the biochemistry of its cells and the yield of its secretion. The morphological development of the gland is followed from embryonic life through the various stages of birth, prepuberty and puberty, and gestation, to the final one of full milk secretion. This development appears to be under the influence of a " mammogenic " hormone of the anterior pituitary, and to be stimulated by the ovarian hormones. When lactation stops the alveolar lobular structure progressively degenerates until the gland reassumes the character of the normal adult gland. Of the various products of active glandular secretion, fat shows the highest degree of variability, the energy value of the milk being directly proportional to the amount of this constituent. In woman's milk three reducing lactose-like sugars have been isolated, and other allied sugars may occur in the milk of other species, although in very small quantities. Blood glucose, lactic acid and other H-O-C products resulting from protein degradation may play a part in the synthesis of lactose, the milk content of which varies from hour to hour. New investigations into the formation of the milk proteins show that the nature of the protein precursors must be revised. The anti-rachitic value of milk can show a 900 % overall variation depending on the season ; sunlight is the most important factor in increasing the vitamin D content of milk, whilst the ascorbic acid content varies widely between different species independently of the season and nutrition, and depends, within the same species, on the breed, individuality, stage of lactation, and the number of lactations, as well as on various other intrinsic and extrinsic factors.—Alfred Eden.

Swett, W. W., Matthews, C. A., & Graves, R. R. (1938). **Nature of the Swelling in the Udder of a Cow at Calving Time.**—*J. Dairy Sci.* **21.** 713-723. 5 figs. [3 refs.]

The udder of a Holstein-Friesian cow was observed at regular intervals from birth to the time of her fourth calving. Up to one year of age the mammary development was below, but at 18 months it was above, the average. An increase in the size of the organ occurred shortly before the end of the first gestation and there was an increase in size at each subsequent calving until after the fourth calving it was enormous. Although milked out before slaughter it then weighed over 165 lbs. Sections revealed an oedematous swelling between the skin and the gland tissue which, in the neighbourhood of the teat, was so great as to shorten the length of the teat. The oedema did not invade the gland tissue. During her third lactation the cow produced 15,200 lbs. of milk in 365 days.—H. V. Hughes.

Gamble, J., Ellis, N. R., & Besley, A. K. (1939). **Composition and Properties of Goat's Milk as Compared with Cow's Milk.**—*Tech. Bull. U.S. Dep. Agric.* No. 671. pp. 72. 11 figs., 32 tables. [Numerous refs.]

The authors have compared over a period of three years the mixed milk of goats of the Saanen and Toggenburg breeds and the milk of cows of the Holstein and Jersey breeds. The goats' milk was similar to that of Holstein milk in percentage of water, protein, fat and lactose. A higher ratio of albumin and globulin to casein was found in goats' milk than in cows' milk. The fat globules of Holstein milk were found to be 1·97 times and of Jersey milk 5·53 times as large as those of goats' milk. A total count of not more than 2,500 bacteria per c.c. of milk is considered a reasonable standard for market goats' milk. In controlled

feeding experiments to determine the comparative nutritive value of the different kinds of milk, it was suggested that the gains in weight took place in proportion to the total energy contained in the milk.—H. V. HUGHES.

I. KELLEY, R. B. (1937). **Studies in Fertility of Sheep.**—*Bull. Coun. sci. industr. Res. Aust.* No. 112. pp. 67. 1 text fig., 6 figs. on 1 plate, 44 tables. [15 refs.]
II. KELLEY, R. B., & DUMARESQ, J. A. (1936). **Studies on Fertility of Sheep.** —*Aust. vet. J.* **12.** 225-227.

I. The present bulletin is to be the first of a series on the normal reproductive functions of sheep under Australian conditions. Three groups of ewes were observed under conditions as nearly natural as possible :– (i) Dorset Horn ewes (highly fertile group) ; (ii) station-bred (*i.e.* flock) Merino ewes (normally fertile group), and (iii) stud Merino ewes (group of low fertility).

Five studies are reported, namely, (a) the incidence and character of oestrus ; (b) the behaviour of ewes on heat and their discovery by rams ; (c) the association of oestrus with ovarian morphology ; (d) the rate of movement of gametes in the female genital tract, and (e) the mating of the main experimental ewe flock and its results.

Differences in the occurrence of oestrus between the groups were not statistically significant in spite of the varying levels of fertility. Both Merino groups had significantly shorter oestrus periods than the Dorset Horn ewes. The di-oestrus period was similar in all groups. The incidence of aberrant periods, however, was significantly higher among the Merinos than the Dorset Horns. In Merinos the most commonly occurring inter-oestrus period is 17 days but a range of 15 to 19 days is regarded as normal. Absence of demonstrable oestrus had no association with old age, plane of nutrition, or the meteorological conditions during the period of observation.

Coloration of ewes by a vasectomized " teaser " ram with a raddled breast was a reliable test of the occurrence of oestrus. A ewe on heat normally voided odoriferous substances by which the ram detected her. Ovulation occurred after or in the last stages of oestrus. The ovum travelled rapidly to the middle third of the Fallopian tube, where it remained for approximately 50 hours and reached the uterus about the 70th hour after the cessation of desire on the part of the ewe. Spermatozoa reached the upper third of the Fallopian tube in about 5 hours. The fertilizing power of spermatozoa was lost about 34 hours after copulation. The time required for this loss appeared less in Merino rams than Dorset Horns. This was associated as a breed characteristic with duration of heat in the ewes of the corresponding breeds.

The normal period of gestation was 148-150 days in all three groups. According to the clinical histories the three possible causes of infertility among the groups under observation were :– (a) absent, aberrant or irregular oestrus ; (b) some pathological condition precluding conception, and (c) early abortion or resorption of the foetus.

II. An abbreviated version of I.—H. B. CARTER.

KELLEY, R. B., & SHAW, H. E. B. (1939). **Observations on the Periodicity of Oestrus in Certain Australian Merino Ewes and a Half-Bred Group.**— —*J. Coun. sci. industr. Res. Aust.* **12.** 18-22. 4 figs.

Continuous observations were made on three groups of Merino and one group of Border Leicester × Merino ewes. Each group of Merinos consisted of ewes from a different strain and each was obtained from a different district of New South Wales. All four groups showed a well-defined periodicity in the percentage of

ewes coming into oestrus. In all groups there was a fall in the incidence of oestrus during the spring, followed by a rise in the summer months, the higher levels being maintained during late summer and autumn.

The present results apply strictly to the immediate locality of the field station. Their significance, and the environmental factors associated with periodicity of oestrus throughout the principal sheep breeding areas of Australia, are being investigated.—H. B. CARTER.

OTTE, W. (1939). Ueber Hypophysen- und Harnprolan. Vergleichende Untersuchungen. [**Pituitary and Urine Forms of Prolan**].—*Berl. Münch. tierärztl. Wschr.* July 7th. 424-427. [12 refs.]

This is an account of investigations into the nature of a substance which has been demonstrated in the urine of the pregnant domestic animals of the large species ; it has been named " urine prolan " by O., as it is distinct in many respects from pituitary prolan. It is considered that this substance is a combination of an oestrogenic substance and specific protein derivatives. Of these latter substances one is toxic and the other has no effect upon the ovaries of mice. All these substances can be demonstrated in the venous blood of the foetus and also in the placenta.—A. T. PHILLIPSON.

HOLTZ, F., & ROSSMAN, E. (1938). Ueber Beziehungen der Sexualhormone zum Kalkstoffwechsel und zu den Nebenschilddrüsen. [**The Relation of the Sex Hormone to Calcium Metabolism and to the Parathyroid Glands**].—*Z. Geburtsh. Gynäk.* **116.** 199-212. 1 fig., 1 table. [10 refs.] [Copied *verbatim* from *Endocrinology*. **25.** 649. Signed Milo Ritter WHITE].

In parathyroidectomized female dogs the serum calcium was maintained at a normal level by the administration of dihydrotachyesterin except when the dogs were in rut. Estrogen corrected hypercalcemia in a parathyroidectomized female dog. In a castrated, parathyroidectomized female dog, the lowered level of the serum Ca resulting from the administration of estrogen persisted in spite of the continued use of dihydrotachysterin. Parathyroidectomized dogs treated with progesteron and with androsteron did not show any consistant change in the serum Ca level. A patient with post-operative tetany is reported, in whom Roentgen castration was followed by a marked diminution in the need for dihydrotachysterin for the maintenance of the serum Ca. The authors conclude that estrogen increased the need for parathyroid hormone more than the male sex hormone and that this explains why tetany is more frequent in women than in men.

JENSEN, H., & TOLKSDORF, Sibylle. (1939). **The Relation of the Anterior Pituitary to Sex and Metabolism.**—*Endocrinology*. **25.** 429-436. 1 table. [Numerous refs.] [Authors' summary copied *verbatim*].

It is evident that the functional integrity of the various endocrine organs is dependent on the anterior pituitary. In regard to the effect of the pituitary on metabolism it is still unsettled whether this influence is solely mediated through the various other endocrine organs or whether the pituitary gland also exerts a direct effect on metabolism (liver). It is generally recognized that metabolism is controlled not by a single factor but by the physiological coordination of various active agents in the body. In this connection one must also consider the possibility of synergistic effects as well as antagonistic actions between certain AP factors and between these AP principles and the secretions of other endocrine glands. Different physiological effects observed may also be due to the same principle, depending on the mode of injection and the dose level.

We feel that so far evidence for the existence of only the following AP principles has been obtained : (a) follicle stimulating hormone, (b) interstitial cell stimulating hormone which appears to be identical with the luteinizing hormone, antagonistic and thyrotropic hormone, (c) prolactin and (d) the adrenotropic principle. The definite proof that only a comparatively small number of active separate principles are secreted by the anterior pituitary would fall in line with cytological studies of this endocrine organ. The presence of three different types of cells has been recognized in this gland (a) chromophobes, (b) eosinophiles, (c) basophiles; only the last two have been reported to show secretory activity.

As yet, with the possible exception of prolactin, no anterior pituitary hormone has been obtained in a sufficiently pure form to allow its chemical identification. The evidence at present indicates that the AP principles are of protein-like nature or else are closely related to proteins. The indication that the anterior pituitary secretes only a comparatively small number of separate active principles should act as an incentive for further attempts of their chemical fractionation and purification and should also greatly help in the final solution of the problem of pituitary physiology.

PIERRE, M. (1939). Endocrinologie surrénale. [**Adrenal Endocrinology**].—*Rev. Méd. vét., Toulouse.* **91.** 241-271. 1 fig.

P. gives a comprehensive review of the knowledge so far obtained regarding the structure and function of the adrenal gland.

Recently several substances have been isolated from the cortex, the most active being corticosterone and adrenosterone. Corticosterone injections will maintain life after the complete removal of the cortex. Adrenosterone is produced by a specialized area of the cortex and possesses an action very similar to that of the male sex hormone. It is suggested that pseudo-hermaphrodism in animals may be due to a faulty production of this substance.

The experimental removal of the adrenal cortex from animals is invariably followed by a well-marked chain of symptoms, and death within 48 hours, but in practice diseases of the cortex are rarely seen. They are usually confined to tumours which are not found until a P.M. examination has been made.

The adrenal medulla possesses the same functions in animals as in man. Diseases of the medulla are not often recorded in animals, the most usual lesions being adenomata which may involve sympathetic ganglia as well as the adrenal medulla.—J. A. NICHOLSON.

MCLEOD, W. M., & WAGERS, R. P. (1939). **The Respiratory System of the Chicken.**—*J. Amer. vet. med. Ass.* **95.** 59-70. 12 figs., 1 table. [6 refs.]

A detailed description in which the authors demonstrate the radical difference between the anatomy of the respiratory tract of the chicken and that of mammals.

The infra-orbital sinus is described as an extensive and complicated diverticulum of the nasal cavity situated ventrolaterally to the eyeball, and communicating also with the mouth. Normally of small size, this sinus may become greatly distended in pathological conditions. The lachrymal duct opens into the nose as usual, although it has an indirect communication with the mouth *via* the palatine cleft. The diaphragm consists of two portions, thoraco-abdominal and pulmonary. The former occupies the same position as in the mammal, and is adherent to the pericardium. The latter exists as a horizontal sheet separating the lungs from the other contents of the thoracic cavity which lie ventral to them. The bronchi, lungs, and air sacs constitute the most complicated portions of the respiratory tract. The primary (meso) bronchus subdivides into numerous secondary and

tertiary bronchi; the latter do not end blindly as alveoli within the lung tissue, but anastomose freely with one another, forming a series of air passages in which the air circulates. The extra-pulmonary bronchi are connected with the air sacs, which exist as outgrowths of them, and the presence of recurrent bronchi assists in the circulation of air throughout the body. Diverticula of these sacs communicate with the interior of most of the bones of the skeleton.—C. W. Ottaway.

King, L. S. (1939). **The Hematoencephalic Barrier.**—*Arch. Neurol. Psychiat., Chicago.* **41.** 51-72. [Numerous refs.] [Abst. in *Arch. Path.* **28.** 405, copied *verbatim.* Signed G. B. Hassin].

Trypan blue injected intravenously into animals colors the dura, the stroma of the choroid plexus and the parenchyma of every organ in the body except the brain. Here only the anterior half of the pituitary body, the pineal body and the area postrema become blue. On the other hand, dye injected into the subarachnoid space causes marked coloring of the cerebral parenchyma. King attempted to explain only the effects of intravenous injections. He holds that trypan blue is attracted only by organs that are relatively rich in connective tissue (the dura or the choroid plexus, for instance). In other words, the affinity of connective tissue for trypan blue is the cause of this phenomenon and not the so-called hematoencephalic barrier which is supposed to be put up by the endothelium and to prevent the dye from passing into the parenchyma. There is increased affinity for trypan blue in inflammatory conditions of the brain. With long-continued administration of trypan blue many cells within the parenchyma stain vitally, especially around the central canal and cornu ammonis, where the dye is flocculated by " suitable cells ".

TECHNIQUE AND APPARATUS

Groat, R. A. (1939). **Two New Mounting Media Superior to Canada Balsam and Gum Damar.**—*Anat. Rec.* **74.** 1-6. 1 table. [Author's summary copied *verbatim.*]

Two new resins, Nevillite V and Nevillite no. 1, which are cycloparaffin polymers, are recommended as mounting media. They are superior to Canada balsam and gum damar in all respects. They are clean, inexpensive, water-white, high-melting, inert, absolutely neutral, chemically homogeneous resins. They are alike in all respects except refractive index and color retention. Nevillite V has a refractive index of 1·544. It is very color stable. Nevillite no. 1 has a refractive index of 1·567. It yellows to a very slight degree with age. Otherwise the resins are unaffected by age and by light.

Toluene has been determined to be the most satisfactory solvent. A solution of 60% Nevillite V or Nevillite no. 1 in 40% toluene by weight is an excellent mounting medium.

Allen, N. N. (1938). **Blood Fat of Dairy Cattle. I. A Simple Volumetric Method for Determining Blood Fat. II. Factors Influencing the Fat Content of the Blood Plasma.**—*Tech. Bull. Minn. agric. Exp. Sta.* No. 130. pp. 52. 16 figs., 11 tables. [Numerous refs.]

I. A simple and rapid volumetric method is described of ascertaining the amount of blood fat in samples of as little as 0·25 ml. of plasma or serum based on the Babcock method of determining milk fat. The blood is digested by an alkaline reagent, and the fat separated by centrifuging and measured volumetrically

in the neck of special containers. The blood fat so obtained contains sterols, sterol esters and fat soluble pigments as well as neutral fat.

II. The method described above was used to determine the fat content of samples of blood taken monthly over a period of two years from a herd of over 100 dairy cattle. Cows showed pronounced individuality in the fat content of their blood plasma and no definite relationship was observed between the fat content of the blood plasma and the breed or the fat content of the milk. The fat content of the blood plasma was low immediately after parturition, and reached its maximum about the fourth and fifth months of lactation, then declined to a low level in the dry period.

It is suggested that fat intake is an important factor influencing the fat content of the plasma for, by heavy grain feeding, with the addition of 15 lbs. of butter fat to each 100 lbs. of concentrate, it was possible to increase the fat content of the plasma of dry cows to a level as high as that occurring during lactation.—H. V. H.

KRASSNOFF, D. (1939). Appareil permettant l'ultrafiltration de petites quantités de liquides (micro-ultrafiltre). [**Apparatus for Ultrafiltration of Small Quantities of Liquid**].—*C. R. Soc. Biol. Paris.* **131.** 487-489. 3 figs. [3 refs.]

A description is given of a simple apparatus consisting of two small glass funnels, clamped mouth to mouth, and capable of filtering 3-5 c.c. of liquid which are introduced by means of a capillary pipette into the reservoir provided by the upper funnel. The lower funnel contains a porous Jena glass disc of 15 mm. in diameter which supports the collodion membrane; an airtight joint is formed between the two funnels by screwing them tightly together on to rubber rings placed between them.—R. ALLCROFT.

NORDGREN, G. (1939). **Investigations on the Sterilization Efficacy of Gaseous Formaldehyde.**—*Acta path. microbiol. scand.* Suppl. No. 40. pp. ix + 165. 12 figs., 28 tables. [Numerous refs.] [In English].

Doubt has increased in recent years regarding the effectiveness of gaseous formaldehyde for sterilization, and recently an investigation by Professor Carl Naeslund has shown that methods employing this agent, as used generally in hospitals, are unreliable. Apparatus based on the Janet and Albarran (or Marion) principles and the " formalin-vacuum-principle " are ineffective for sterilizing surgical instruments. Experiments were made to find if and under what conditions, formaldehyde sterilization could be made effective.

An examination of the physical and chemical properties of formaldehyde is described, from which it is concluded that, contrary to the findings of previous investigators, " dry " formaldehyde gas does not consist mainly of polymerized molecules but almost entirely of simple molecules. Study of the vapour pressure curves of paraformaldehyde and saturated solution of formaldehyde showed these to be practically coincident.

N. elaborates a new technique for the quantitative evaluation of gaseous germicides and shows that, when tested against naked organisms and under ideal conditions of test, formaldehyde gas is effective against a large variety of sporulating and non-sporulating bacteria. In this connexion he studied the effects of time and temperature, and of variation in the partial pressure of water vapour. Under more practical conditions, however, formaldehyde is shown to lose some of its effectiveness. Rough surfaces, such as rubber, are much more difficult to sterilize than smooth ones like glass or metal, and the presence of blood, sputum, oil or soil is shown to act as a protection to the bacteria.

The method advocated by N. for the sterilization of certain small objects such as instruments, is that, after the creation of a vacuum in the sterilizer, air saturated with formaldehyde vapour is introduced until there is equilibrium with the pressure of the outside air. This rise in pressure is stated to cause penetration of porous material. Catheters treated in this manner at 60°C. for one hour are claimed to be sterile.

The results of a large number of tests under widely varying conditions are recorded.—H. E. Bywater.

MISCELLANEOUS

Barbosa, S. (1938). Mesures préventives à prendre en campagne, pour lutter contre les épizooties. [**Preventive Measures for Control of Animal Diseases in War-Time (Brazil)**].—*Rep. 13th int. vet. Congr. 1938.* **2.** 1226-1233. [In French: English, German and Italian summaries. Discussion pp. 1233-1237 in English and French].

The work of the Brazilian Army Veterinary Service is directed towards active prophylaxis which is considered to be of prime importance. Therapeutics applied to the individual is uneconomical and, for the end in view, ineffective. The preventive measures are sustained by constant observation and supervision, and aim at removing the causes of ill-health such as centres of infection, and at strengthening resistance by the application of biological antidotes, sufficient and proper food, and sound hygiene. These activities are made possible by the organization of a trained specialized personnel working in co-operation with other arms. The thoroughness of their execution is governed only by military exigencies. The result is satisfactory.

In the discussion Martinez gave a review of the activities of the veterinary service of the former Spanish Government Forces and a description of the health of their animals.—G. Williamson.

Gilruth, J. A. (1937). **Recent Contributions to Veterinary Science by Australian and New Zealand Workers.**—*Rep. Aust. Ass. Adv. Sci. 1937.* pp. 289-306. [16 refs.]

G. presented a general survey of the post-war contributions of Australian and New Zealand workers to problems in veterinary science. Particular reference is made to the following :– black disease or infectious necrotic hepatitis ; enterotoxaemia or braxy-like disease of sheep ; contagious bovine pleuro-pneumonia ; botulism ; caseous lymphadenitis of sheep ; cutaneous myiasis or blowfly-strike of sheep ; internal parasites of livestock ; deficiency diseases such as bush sickness, Denmark disease, coast disease, enzootic marasmus, etc., and haematuria vesicalis (redwater) of cattle.—H. B. Carter.

Loewenthal, L. J. A., & Wilson, W. A. (1939). **Problems of Chance in Medicine and Research.**—*Brit. med. J.* July 15th. 110-112. 1 table. [8 refs.]

The statistical significance of the difference of frequencies in two groups is generally determined by the $\sqrt{n\,p\,q}$ formula. The valid use of this formula is subject to certain conditions which are not always obtained, especially with small samples ; moreover to use the formula a certain amount of calculation is necessary. The authors have therefore published a table of figures, calculated by a precise factorial method, by which it is possible to determine at a glance whether an observed difference is significant or not. The table shows the necessary differences

for two levels of significance, corresponding to odds of 19 to 1 and 199 to 1 against their being due to chance. Several examples from current scientific literature are given to show how the table may be used. [It will be clear, of course, that this table can be used only for the differences of frequencies and not of variables].
—F. W. Priestley.

Tagand, R., & Tisseur. (1939). L'identification du cheval au moyen des crêtes palatines. [**Identification of Horses by Impressions of the Palate**].—*Rev. Méd. vét., Toulouse.* **91.** 185-211. 16 figs.

This work is divided into two sections ; in the first is studied the superficial markings of the palate, and in the second these observations are applied to the identification of horses. The authors conclude, after having examined about 300 equine palates, that the palatine ridges in the horse are sufficiently variable for identification purposes. They classify the identifiable features in the following order :– origin of the ridges, form of the median tubercle, appearance of the raphe, and the slope and direction of the ridges. These features do not change with the age of the horse. The authors recommend that all descriptions of horses should be accompanied by a photograph or impression of the palate showing the ridges.
—N. J. Scorgie.

Michaelis, L., & Smythe, C. V. (1938). **Biological Oxidations and Reductions.** —*Ann. Rev. Biochem.* **7.** 1-36. [Numerous refs.]

The article is a review of the more important experimental work in connexion with biological oxidations and reductions carried out during the year. The names of the workers are given in each case.

A haemin, apparently identical with the haemin of cytochrome C, has been prepared from mammalian blood. It amounts to 4% of the total haemin of the blood and is probably combined with globin to form part of the haemoglobin.

The formation of methaemoglobin from haemoglobin during respiration is considered to be correlated with the oxygen uptake and is not catalytically increased by copper or an indifferent colloidal material. Methaemoglobin is reduced to haemoglobin in tissues only under anaerobic conditions.

By means of a photo-electric device, the degree of oxygen saturation of the intracellular muscle haemoglobin in a cat's muscle can be measured instantaneously and recorded. The oxygen storage is sufficient to tide the muscle over from one contraction to the next.

The respiration of normal and scorbutic g. pig liver and kidney has been studied. The oxygen consumption and carbon dioxide production of liver were increased with the onset of scurvy, but the kidney showed no change. The anaerobic lactic-acid production of each tissue and the aerobic lactic-acid production of liver were found to be unchanged.—H. V. Hughes.

OFFICIAL AND OTHER REPORTS

Great Britain. (1938). **Report on the Work of the London School of Hygiene and Tropical Medicine (University of London) Incorporating the Ross Institute, for the Year 1936-1937.** pp. xiv + 110. 4 photographs, 3 appendixes. London : London School of Hygiene and Tropical Medicine. [8vo].

The following sections are of interest :–

Department of Helminthology.—Leiper attempted to settle the question of the longevity of *Diphyllobothrium* in man, by publishing results of his experiments

and observations on the duration of experimental infections in man and dogs in Britain. The complete development of *Opisthorchis felineus* was obtained experimentally in the English freshwater snail *Bithynia leachi*.

Department of Protozoology.—A large series of experiments was devised and is still in progress, with the object of determining the duration of cases of human African trypanosomiasis, and the degree of protection provided by trypanocidal substances of different kinds. Investigations were also carried out on the effect of partial blockage of the reticulo-endothelial system by means of various substances, in order to prevent the occurrence of additional infections or of intercurrent disease processes which would influence the effective action of the drugs.

Division of Bacteriology and Immunology.—Stamp and Hendry continued their study of immunologically active fractions derived from haemolytic streptococci. It was possible, with certain strains of streptococci, to isolate fractions which induce an effective immunity in mice.

Among other things, it is hoped that certain anomalies which have been encountered in agglutination reactions with organisms of the salmonella group may be elucidated by a study of the serological reactions of the chemical fractions isolated, and of antisera prepared against them.

Topley and Wilson, in collaboration with Greenwood, Bradley Hill and Watson, continued their study of experimental epidemics in mice, especially with regard to the effect of diet on the epidemic spread of mouse typhoid; results showed that the same change in diet which renders individual mice more resistant to *Salmonella typhi-murium*, or to its toxin, significantly reduces the mortality of a herd among which the disease is spreading by natural contact. Studies on the nutritive value for mice of raw and pasteurized milk, using over 2,000 animals, indicated that if there is any difference between the two types of milk it must be small. Further studies made at the conclusion of the experimental period of observation failed to show any difference in the two groups in resistance to infection with a natural parasite, *S. typhi-murium*. Reference is made to similar experiments carried out by Wilson and Minett [*V. B.* **7.** 643.], from which it was concluded that there is no difference in the nutritive values of these types of milk.

A technique was developed by Wilson, Hobbs, and Maier for the biological standardization of methylene blue, the results of which method agree with those given by the titanium chloride method of titration. Investigation by Hobbs into the mechanism of the methylene blue reduction test in milk was completed.

Schwabacher completed work on tuberculous superinfection of laboratory animals. Among other interesting observations made by her were those on the effect of minimal numbers of organisms injected into mice, and on the protective effect of dead, and living virulent, vaccines of tubercle bacilli.

Duncan continued his studies on the quantitative relationship of the reagents concerned in the specific agglutination of bacteria, and an attempt is now being made to determine the antigenic constituents of the bacterial surface by a quantitative estimation of the antibodies removed from fully sensitized bacteria.

Watson continued the study of the effect of diet on mice, in relation to fertility, survival, growth and resistance to infection. Results confirmed previous findings, namely, that the resistance of mice to infection with living *S. typhi-murium* and to infection with a toxic fraction isolated from that organism is influenced by the diet on which the mice are bred and reared. Diets containing a mixture of animal protein, in the form of dried separated milk, and vegetable protein, were found to confer a greater resistance to infection and toxaemia than diets containing vegetable protein alone.

Asheshov continued his study of the effect of bacteriophage in experimental

infections. Along with TOPLEY and WILSON he showed that a particular bacteriophage, active against virulent strains of *S. typhi*, exerts a very effective protective action in mice. These findings constitute the first clear demonstration that a bacteriophage may exert a well-marked effect of this kind when it encounters virulent bacteria in the tissues of an experimentally infected animal. Work along similar lines is being continued with *S. typhi-murium*, which is a natural pathogen of the mouse.

DIVISION OF BIOCHEMISTRY AND CHEMISTRY AS APPLIED TO HYGIENE.—ERIKSON was preparing a monograph on *Actinomyces*. CHALLINOR continued his work on isolation of antigens. HENDRY and STAMP continued investigation of the immunizing fractions of various strains of streptococci, concentrating on the antigens of Group A strains, and immunizing protein fractions of the histone type were obtained from two of these. As they are much less stable than the corresponding fractions from Group C strains, efforts are being made to increase their activity. Large scale investigations were in progress for this purpose and also for work on the other strains of the organism.

DEPARTMENT OF CHEMISTRY AS APPLIED TO HYGIENE.—WOOLDRIDGE continued research on problems associated with bacterial metabolism and demonstrated how the production of certain bacterial enzymes may be affected by the conditions of the culture medium.

INSTITUTE OF AGRICULTURAL PARASITOLOGY.—A survey of liver fluke in sheep and studies of the bionomics and control of *Limnaea truncatula* were undertaken by PETERS. Research on the intestinal helminths of large farm animals was carried out, and is being continued, under J. W. G. LEIPER. The importance of hay in the spread of helminth infestation in sheep and goats was studied. Work was also done to determine the value of calcium cyanamide in reducing residual helminth infection on field plots. A study was made of the biology of the larval stages of horse strongyles, and of methods of control by the application of various chemicals to infected stables and pastures. Natural infection of goats with *Trichostrongylus retortaeformis* of the rabbit was observed for the first time, and confirmed by an experimental infection of hand-reared goats.

An account was published of work on *Ascaris megalocephala* of pigs by CLAPHAM, who has studied more especially the question of infectivity of small repeated doses.

SANDERSON continued the search for a nematocidal substance of value in the treatment of intestinal parasites of sheep.

The pathology of helminth infestations in birds was investigated by CLAPHAM. It was found that certain common helminths, not usually associated with disease, may on occasion produce symptoms, and even death. *Capillaria longicollis* and *Ascaris lineata* have produced fatal results in several domestic birds. The relation of chronic wasting diseases to helminths was being investigated. There was evidence that resistance to helminths is definitely lowered in cases of leucaemia, and possibly in fowl paralysis.

Data on the nature and degree of helminthiasis in domestic and wild birds as vectors was being assessed. Plots were being seeded down with eggs and larvae of parasites of wild birds in preparation for future study.

The detailed development of *Trichostrongylus tenuis* within the host was worked out. It is completed in the very short period of seven days.

The value of free range for poultry in regard to helminths, and the rate of spread of helminths on to clean land, were being investigated.

Preparations were begun by CLAPHAM for research on immunity, using cestodes of dogs and cats.—J. C. WALLACE.

AUSTRALIA. QUEENSLAND. (1937). **Report of the Director, Animal Health Station, Yeerongpilly [1936-37].** [RUDD, J. A., & MULHEARN, C. R.]—*Rep. Dep. Agric. Qd, 1936-37.* pp. 16 and 140-146. 1 table.

STAFF.

The Animal Health Station at Oonoonba was taken over on October 1st 1936 from the Council for Scientific and Industrial Research. The administration of veterinary services in that portion of the state north of and including Mackay is now conducted from this centre. The station staff comprises two veterinary officers, technical assistants, a clerical officer and outside employees. The field staff consists of two veterinary officers, three district inspectors and fifteen stock inspectors. An account of the work at the Animal Health Station, Yeerongpilly, and that at Oonoonba is given.

ANIMAL DISEASES.

CATTLE.—A survey of possible insect vectors in three areas where " three day sickness " (ephemeral fever) is endemic has been made. *Haemonchus contortus*, *Cooperia* spp. and *Oesophagostomum radiatum* were found to be the most important species in a survey of gastro-intestinal helminths. Inoculation against tick fever and anaplasmosis from reservoirs carrying *Babesia bigemina* and *Anaplasma centrale* is being continued. The most common form of tick fever is caused by *Babesiella argentina* [*Babesia argentina*]. Acaprin is being tested extensively. Seven outbreaks of contagious bovine pleuro-pneumonia were successfully controlled by quarantine and inoculation with virus vaccine, which is proving very satisfactory. 143,300 doses of vaccine were distributed by the two stations during the year, mostly for preventive inoculation in travelling stock.

HORSES.—A condition similar to " walkabout disease " was reported from the north west corner of the state, and whitewood (*Atalaya hemiglauca*) was suspected as the cause. " Swamp cancer " was prevalent in the coastal region.

SWINE.—The outstanding diseases reported were haemorrhagic septicaemia, parasitic pneumonia, posterior paralysis, sterility, and losses due to improper feeding.

SHEEP.—A survey of the prevalence and distribution of gastro-intestinal helminths was completed and published [*V. B.* **7**, 384].

Serious mortality was reported to have occurred in rams from New South Wales, and it is suspected that these were due to plant poisoning. Extensive shedding of the fleece due to unknown causes was reported from a restricted belt of country near Hughenden. Sheep blowfly strike assumed serious proportions throughout the state.

POULTRY.—Investigations into the pathogenicity of the caecum worm (*Heterakis gallinae*) were completed. Promising results were obtained in the treatment of poultry with nicotine sulphate against infestation with the large roundworm (*Ascaridia galli*).—H. B. CARTER.

NORTHERN RHODESIA. (1938). **Annual Report of the Veterinary Department for the Year 1937.** [MORRIS, J. P. A.].—*Rep. vet. Dep. N. Rhod., 1937.* pp. 5-22.

STAFF.—There were eight veterinary officers ; work in the field and in research was again seriously handicapped by lack of staff. The expenditure was £20,849.

LIVESTOCK INDUSTRY.—Rainfall was good and grazing well maintained into the dry season. 2,857 cattle, 4,130 sheep and 757,000 lb. of frozen meat were imported. Improved meat ration scales for native labourers caused increased demand, and local supplies were inadequate. A Cattle Marketing and Control Board formed in 1937 controls prices, grading, distribution of profit, importation of slaughter stock, etc.

Animal Diseases.—Eight outbreaks of Anthrax and 69 of Blackleg were controlled by quarantine and vaccination. Improved meat inspection revealed a greater incidence of Bovine Tuberculosis than was believed to exist. A single case of Johne's Disease, the first in Northern Rhodesia, was recorded. Glanders has not occurred since 1928. Contagious Abortion is enzootic. There were 33 outbreaks of Streptothricosis. Broncho-pneumonia in sheep is recorded; dipping of affected animals aggravates the disease. Transmission experiments failed [see also *V. B.* **7.** 150].

Remarks on East Coast Fever, Anaplasmosis, Piroplasmosis and Trypanosomiasis are similar to those in last year's report [*V. B.* **8.** 480]. 107 outbreaks of Heartwater occurred. Heartwater symptoms and lesions were observed in a young sable antelope.

The Territory remained free from Rinderpest, though the position in Tanganyika caused anxiety and special patrols were set up along the inter-territorial border. The Territory continued to be free from Foot and Mouth Disease. Contagious Bovine Pleuro-pneumonia remained confined to Barotse province; an eradication scheme commenced in 1936 was continued. Experimental use of Kabete cultured virus under local conditions gave promising results [*V. B.* **9.** 705.] and widescale use of the virus in the field was commenced late in 1937. Cases of Sweating Sickness in calves are recorded.

African Horse-Sickness was successfully controlled with Onderstepoort neurotropic vaccine. Rabies was prevalent, though the number of reported outbreaks was less than in previous years. Lack of funds still prevented the carrying out of the control scheme recorded in previous reports.—H. E. Harbour.

Northern Rhodesia. (1938). **Annual Report [of the Veterinary Research Officer] 1937.** [le Roux, P. L.]—*Rep. vet. Dep. N. Rhod., 1937.* pp. 35-70. Numerous tables.

Lack of staff and funds hampered research.

Animal Diseases.—A mild form of Sweating Sickness [see *V. B.* **4.** 262.] unassociated with sweating is common in N. Rhodesia; it is far milder than that described in the text-books, and is not confined to young calves. During the rains the acute form is usually observed.

Deaths appear to be the result of bacterial invasion of the epidermis and of the gastro-intestinal mucosa. In acute cases intravenous injection of 1-2 c.c. formalin in 4-8 c.c. distilled water is said to inhibit excessive excoriation of epidermis and reduce the diarrhoea.

Acaprin was found useful in treating Canine Babesiasis. Notes on anthelmintic treatments are given. Preference is expressed for using carbon tetrachloride in wireworm and hookworm infestations of sheep. The Onderstepoort remedy for *Oesophagostomum columbianum* (the nodular worm) was only successful in light infestations. Rotational grazing proved the most valuable method of helminth control.

Ticks were more prevalent than in 1936: this is ascribed to the non-burning of the pastures in 1936 and 1937. The clipping of long hair from the tails of cattle is a great aid to the avoidance of infestation.

Cases of Posterior Paralysis in imported Sussex and S. Devon bulls are believed to be "manifestations of a transmissible hereditary factor". Inbreeding is suggested as a factor, and breeding records of Sussex stock are detailed.

General remarks on the livestock industry conclude the report.—H. E. H.

Sierra Leone. (1938). **Report on Livestock, 1937.** [Roach, S. A.]—*Rep. Dep. Agric. Sierra Leone, 1937.* pp. 62-63.

The observations of the Livestock Officer on the health of the stock seen on tours of the area are recorded. Duties were commenced on the 28th August 1937. Deaths were reported as a result of *Stomoxys* attacks in the Komboya Chiefdom. *Trypanosoma vivax* was recovered from a cow in the Taiama district. Deaths in sheep at Njala were ascribed to plant poisoning. Losses in poultry were due to worms, gape-worms, ants and hawks. [There is no veterinary department in Sierra Leone].—J. C. Wallace.

France. (1938). Rapport sur les opérations du service vétérinaire sanitaire de Paris et du département de la Seine pendant l'année 1937. [**Report of the Veterinary Services of Paris and the Department of the Seine for 1937**]. [Chrétien, A.] pp. 172. 18 figs., numerous tables, 1 graph. [12 refs.] Paris : Imprimerie Chaix. [4to].

Animal Population in the Seine Department.—There were 12,220 horses, 18 mules, 45 asses, 11 bulls, 3,732 cows, 31 calves, 175 sheep, 53 goats and 4,936 pigs in the department. 23,433,160 kg. of poultry and game were brought into the markets.

Sanitary Police Measures against Contagious Diseases.—Apart from certain of the scheduled diseases that normally do not occur in France, there were no cases of rabies, mange, anthrax, sheep pox, anaplasmosis, glanders, swine fever, or infectious enteritis in swine. There were 670 cases of Foot and Mouth Disease and 132 cases of Tuberculosis. The total number of *ante-mortem* seizures for inspection was 2,820.

Inspection of Meat.—The number of P.M. inspections was 2,859,647. The total number of P.M. seizures was 15,849, of which 3,174 were for TB. 133,343,949 kg. of meat were consumed in Paris in 1937. Detailed statistics of meat inspection in the various markets are given under the separate reports of each.

Laboratory Diagnosis.—1,676 examinations were made in the Laboratory of the Central Market. A detailed description of this work is given, as well as of that done in the laboratories attached to the abattoirs.

Contagious Diseases.—22 cases of Bovine Tuberculosis, 1,412 cases of Foot and Mouth Disease, and 705 cases of Mange were recognized *ante-mortem* in the markets. 537,991 cases of TB. were recognized P.M. in the abattoirs of La Villette and Vaugirard, and 1,433 cases of Foot and Mouth Disease in the abattoir of Vaugirard.

Abattoirs.—In the abattoirs of La Villette and Vaugirard 1,177,412 animals were killed, making 197,272,523 kg. of meat, of which 1,844,794 kg. were seized. Besides these two, there are eight other abattoirs in the Department of the Seine.

Milk Inspection.—The number of classified dairy farms continued to diminish. The total number of milch cows in all the dairies was 3,732, and the amount of milk produced per day, 39,610 litres. Laboratory work in connexion with milk is described in the section dealing with laboratory diagnosis, and the pasteurization figures are given in the section dealing with the inspection of eggs.

Sweden. (1939). Det civila veterinärväsendet år 1937 av kungl. medicinalstyrelsen. [**Sweden : Civil Veterinary Report for 1937**]. [Frykholm, N.] pp. v + 45. [16 tables]. Stockholm : P. A. Norstedt & Soner. [8vo] [French summary].

Personnel.—The number of veterinarians in Sweden in 1937 was 630, an increase of 15 over 1936. Particulars are given of their class of activity ; 458 were in the state veterinary service and these attended to 1,800,000 animals during the year.

Livestock Diseases.—Details are given only of the following scheduled diseases :– anthrax, tuberculosis, bovine brucellosis, pullorum disease, blackleg and equine infectious anaemia. The only reference to other diseases is in a statistical section of the report (cases seen and treated).

There were 82 outbreaks of anthrax with 98 deaths. In the control of bovine TB., 390,000 animals were tuberculin tested for the first time ; 6·3% reacted. Of 444,728 tests on cattle tested previously, 4·4% reacted. The number of TB.-free herds was 63,000 with about 597,000 animals. 11,636 cattle found affected with pulmonary TB. (by lung mucus examinations) were killed and over 250,000 Kr. were paid in compensation. Statistics are also given concerning TB. of the udder and genital tract, and of the extent to which there was infection of the milk supply with tubercle bacilli.

Bovine brucellosis was diagnosed in 7,824 cattle in 2,130 herds ; pullorum disease in ten flocks, blackleg in 13 herds and equine infectious anaemia in 795 horses.

State Veterinary Bacteriological Institute.—Statistics are given for the diagnostic work carried out and for the biological products issued.

Meat and Milk Inspection.—The original should be seen as the work is reported in tabular form. There is nothing which calls for special comment.—J. E.

United States of America. (1938). **Report of the Division of Veterinary Science, Michigan State College of Agriculture and Applied Science, East Lansing, 1937-1938.** [Giltner, W.] pp. 51. Numerous tables. [8vo].

A brief general report is given of the activities of the Veterinary College, and is followed by the reports of the various departments.

Animal Pathology. [Hallman, B. J.] Under the Federal Brucella Infection Control nearly 4,000 accredited herds have been added in the year. The incidence of infection in Michigan cattle is now about 10%. During the year ended 31st October 1937, a total of 245,345 cattle were tested and 8,351 (3·4%) reactors were found, a slight reduction compared with 1936-1937 (3·6%).

The number of horses treated for parasites was 53,245. There were preliminary discussions in connexion with mastitis, trichiniasis and trichomonas infection.

Experimental Work. [Stafseth, H. J.] Further research was carried out with a view to improving the antigen used in the whole blood agglutination test for pullorum disease. Tables show the results of routine examination of specimens from mammals. 5,360 poultry specimens were submitted for examination, an increase of 1,682 over the previous year ; a summary of autopsies is included. 15,400 doses of fowl pox vaccine were issued.

Experimental Station Work. [Gardner, V. R.] Observations on three herds in which contagious bovine abortion has long existed are recorded ; eradication by blood agglutination testing, segregation and removal of reactors was practised. Non-specific abortions occurring in the same herds were also studied.

—J. C. Wallace.

BOOK REVIEWS

Gildemeister, E. [Prof. Dr., Vizepräsident des Instituts Robert Koch, Berlin], Haagen, E. [Prof. Dr. Abteilungsleiter am Institut Robert Koch, Berlin], & Waldmann, O. [Prof. Dr., Direktor der Staatl. Forschungsanstalten, Insel Riems bei Greifswald]. (1939). Handbuch der Viruskrankheiten mit besonderer Berücksichtigung ihrer experimentellen Erforschung. [**Handbook of Virus Diseases**]. 2 volumes. pp. x + 652 and pp. iv + 768.

Numerous figs., plates, tables, charts. [Numerous refs.] Jena: Gustav Fischer. [4to] [RM. 40] [RM. 44].

This book may be regarded as a revision of the articles on virus diseases by KOLLE, KRAUS and UHLENHUTH [(1929). *Handbuch der pathogenen Mikroorganismen.* Jena: Gustav Fischer; Berlin and Vienna: Urban and Schwargenberg], though many new diseases have been introduced, including some that are still of doubtful aetiology.

The first volume contains eight general articles on viruses, their nature, immunology etc., and the first part of the special section comprising the pustular, vesicular, exanthematic and septicaemic virus diseases of animals and man. The second volume completes the special part and comprises virus diseases classified according to localization (respiratory system, nervous system and other organs), virus diseases of cold blooded animals and of plants, virus-caused tumours, and diseases caused by filtrable organisms (rickettsiases, bartonelliases, contagious bovine pleuro-pneumonia and contagious agalactia). Finally there is a section on a few diseases of as yet doubtful aetiology, about which there is a little evidence as to virus causation.

In general the individual reviewers have incorporated the literature up to the end of 1937, though some go far into 1938, and have provided reference lists which are intended to act as supplements for those in the KOLLE, KRAUS and UHLENHUTH handbook. While there is evidence that the reviewers are well posted in periodical literature of note, they have missed some important information which is contained in certain annual reports of the British Empire. Thus the reader of the article on rinderpest would never suspect that the goat vaccine had almost superseded serum-virus inoculation in India, or that the culture vaccine method had been used long since for immunization against contagious bovine pleuro-pneumonia in the Sudan.

The whole publication is, as would be expected, a mine of information and particularly valuable for reference. The printing is up to the usual high standard.

—J. E.

BIGGER, J. W. [M.D., Sc.D. (Dublin), F.R.C.P.I., M.R.C.P. (Lond.), D.P.H., M.R.I.A. Professor of Bacteriology and Preventive Medicine, University of Dublin]. (1939). **Handbook of Bacteriology for Students and Practioners of Medicine.** pp. xvi + 466. 100 figs., 5 plates, 1 table. London: Baillière, Tindall & Cox. [5th Edit.] [8vo] [12s. 6d.]

The popularity of this handbook amongst medical students is proved by the appearance of the fifth edition. The reason for this is obvious, as it presents in a very readable form all the more important facts relating to bacteria as they affect man. The subject matter has been brought up to date and much new information has been incorporated. The size of the book, however, has been changed but little, as less important matter has been condensed or omitted.

It is refreshing to see that some uniformity is now being achieved in regard to bacterial nomenclature, and the author has adopted, for the first time, some of the newer names applied to bacteria.

The book is too well known to require any detailed comment and it only remains to be said that this edition cannot but enhance its value as a medical students' text-book. Its value to the veterinary student is naturally limited to those chapters which deal with general bacteriology, but to those who wish to have on their book-shelves a handy and concise handbook on the bacteriology of human diseases, this book is to be warmly recommended.—GWILYM O. DAVIES.

ROSENTHAL, S. R. [M.D., Ph.D., Associate in Bacteriology and Public Health]. (1938). **The General Tissue and Humoral Response to an Avirulent**

Tubercle Bacillus.—*Ill. med. dent. Mongr.* **2.** No. 2. pp. 184. 80 figs., 1 plate, 9 tables, 23 charts. [Numerous refs.] Urbana, Ill.: University of Illinois Press. [4to] [$2.50].

This monograph, which is virtually a study of BCG, surveys the literature on the subject and also records the author's personal investigations. The early part is devoted to proofs that BCG is non-pathogenic and incapable of regaining its virulence, and to the denial that the organism, when subjected to the manipulations suggested by other workers, is able to revert to a virulent phase. Different types of colony formation and cycles of development are also described.

The main part of the book is concerned with the nature of the cellular reactions which follow the injection of BCG. The three routes selected were intravenous and intradermal injections and oral administration. The test animal throughout was the g. pig, sections being prepared from all the important organs at intervals varying from half-an-hour up to two or three months after the administration of the organism. It is shown that in addition to the specific response which is directly evoked by BCG and is represented by the formation of retrogressive tubercles, there is an indirect and probably non-specific stimulation of the reticulo-endothelial system in all parts of the body. The latter reaction may commence within an hour of injection.

Each chapter is provided with a comprehensive bibliography, while the illustrations are numerous and well reproduced.—R. E. GLOVER.

Fox, H. [Professor of Comparative Pathology, University of Pennsylvania; Director, William Pepper Laboratory, Hospital of the University of Pennsylvania]. (1939). **Chronic Arthritis in Wild Mammals.**—*Trans. Amer. phil. Soc.* **31.** 73-148. 17 figs. on 12 plates, 1 table, 2 charts. Philadelphia: The American Philosophical Society. [4to] [9s.]

The author of this valuable monograph is well known to all interested in comparative pathology for his book "Diseases of Captive Wild Mammals and Birds" [(1923). Philadelphia: Libbentrop & Co.]. The contribution under review deals with a subject which has long been neglected by comparative pathologists and which, although one of the most serious diseases affecting man, forms a chapter the details of which are still largely obscure.

The work is based on the examination of 1,749 skeletons obtained from various sources, among which 77 were found to be affected with one or other type of chronic arthritis, and each case is described in detail, the majority being illustrated by photographs and radiographs.

It was not possible to relate the occurrence of chronic arthritis to taxonomic position, zoogeography, ecology, habits, diet or focal infections. A significant factor appeared to be the relative proportion of body size to limb size, macrosomic animals being more frequently affected. The commonest site in all species was the spinal column. In carnivora, the fore limbs were involved more often than the hind limbs, the reverse being found in herbivora. Cases of hypertrophic arthritis very similar to those seen in man were observed in a bear and two gorillas. In general, the changes were mainly of a productive character in carnivora and were porotic and ulcerative in herbivora.

It is worthy of special note that no case of chronic arthritis was found in the 58 Canidae examined, and that among the Felidae examples of the condition were found only in the larger members (jaguar, leopard, lion and tiger). A particularly high incidence was seen in the hyaena (9 out of 18) and the gorilla (15 out of 90).

This monograph should certainly take its place with the authors' previous well-known book on the shelves in libraries, and wherever a special interest in the problem

of arthritis exists—and it is a problem which might well receive more attention from veterinary pathologists.—E. G. WHITE.

BENEDICT, F. G. [Director, Nutrition Laboratory, Carnegie Institution of Washington]. (1938). **Vital Energetics. A Study in Comparative Basal Metabolism.** —*Publ. Carneg. Instn.* No. 503. pp. 215. 45 figs., 4 tables. [Numerous refs.] Washington D.C.: Carnegie Institution of Washington. [4to].

An authoritative review of the present knowledge concerning the energy exchanges of the body is to be welcomed, since data has been accumulating steadily for many years and there has been little attempt to classify it, particularly from the comparative point of view, so that this publication fills an obvious gap in the literature.

The work is mainly concerned with intra- and interspecific comparisons of the heat production of cold- and warm-blooded animals and man made from data collected over a period of many years at the Carnegie Institute. There is also a most instructive and necessary discussion on the methods used for presenting metabolism data. There is no doubt that much confusion has arisen in the past from the different values given to the constant K by different workers, and it is suggested that complex mathematical calculations based on surface area and also the tabular presentation of data should be abandoned in favour of simple graphic presentation, plotting the total 24 hour heat production arithmetically in relation to the total body weight. This method is adopted throughout the work. It certainly leads to simplification and seems to be without objection. It is also insisted that all measurements on warm-blooded animals should be made at 28°C., *i.e.* within the zone of thermic neutrality. This upsets all Rubner's calculations made at 16°C. and it seems that his surface law must now be abandoned.

The general conclusions reached are that the larger the animal the larger the total heat production, and that heat production is not constant either per unit weight or per unit of surface. The interesting fact emerges in this connexion that the basal metabolism may be greatly altered simply by a change of diet. Thus cows when grazing showed a higher basal metabolism than when they were being fed on dry fodder.

The review contains a wealth of information concerning animals of every type and is certain to have a far reaching effect on the conduct and interpretation of future metabolism experiments.—J. A. NICHOLSON.

MUENSCHER, W. C. [Professor of Botany, New York State College of Agriculture, Cornell University, Ithaca, New York]. (1939). **Poisonous Plants of the United States.** pp. xvii + 266. 75 figs. [Numerous refs.] London & New York: The Macmillan Company. [8vo] [15s.]

This is one of the American Rural Science Series primarily intended to give a compendium of poisonous or dangerous plants, for the guidance of practical workers. The list is comprehensive, the illustrations are very good. The accounts of causation, symptoms and treatment are sufficient for the main purpose of the work, although they are not adequate for a complete toxicological treatise. Like the vast majority of earlier writers on this topic, the author, after reviewing possible methods of classification, decides in favour of following the natural orders. This is very wise—for instance, he lists *Conium maculatum* as a plant likely to cause contact dermatitis, and to affect the flavour of milk, as well as causing true poisoning by the alkaloid conine. The author follows recent American opinion in suggesting that selenium may be a cause of the typically American loco disease.—G. D. LANDER.

[Quite shortly after receiving the above abstract from Dr Lander, the Bureau learned with much regret of his death. Dr Lander had been a contributor to the Veterinary Bulletin from the beginning.—Ed.]

INDEX VETERINARIUS

The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education and other aspects of veterinary science.

The latest list of the publications indexed for this purpose was included in *Index Veterinarius*, Vol. 6, No. 1 (issued December, 1938) and also circulated with the *Veterinary Bulletin*, Vol. 9, No. 1.

About 10,000 references are indexed each year, each reference being suitably cross-indexed alphabetically under subjects and under names of authors.

As each half-yearly issue consists of a single complete alphabetical index of subjects and authors' names, a search through it involves a minimum of trouble, and all information required is readily found.

Each number contains the indexing done by the Bureau during the previous half-year, *i.e.*, No. 1, issued in December, covers the indexing done during the previous January to June.

The dates of issue of the two numbers of each volume are as follows:—

No. 1.—Issued December. Indexing period previous January—June.
No. 2.—Issued June. Indexing period previous July—December.

Vols. 1 to 3 (1933, 1934 and 1935) of the Index were produced on a duplicator; from Vol. 4 onwards it has been printed.

Vols. 1 to 5 were issued in quarterly parts; the issue is now half-yearly.

Annual Subscription, £5.

A limited number of copies printed on one side only are available for those who wish to mount references on cards.

Orders may be sent to:—

IMPERIAL BUREAU OF ANIMAL HEALTH,
NEW HAW, WEYBRIDGE,
SURREY, ENGLAND.

IMPERIAL AGRICULTURAL BUREAUX

Imperial Bureau of Dairy Science

Shinfield, Reading, England

DAIRY SCIENCE ABSTRACTS

A comprehensive collection of abstracts of current literature dealing with milk and dairy products: husbandry, technology, control and standards, economics, physiology, bacteriology and mycology, chemistry and physics. Published quarterly. Subscription 25s. per volume of 4 numbers (5s. discount to British subjects who subscribe direct): single copies, 7s. 6d.

Technical Communications

No. 1. The phosphatase test for control of efficiency of pasteurisation. H. D. Kay, R. Aschaffenburg and F. K. Neave. Price 2s. (postage 2d. extra).

Imperial Bureau of Animal Nutrition

Rowett Institute, Aberdeen, Scotland

NUTRITION ABSTRACTS AND REVIEWS

Consists of abstracts of papers published throughout the world dealing with the subject of nutrition in all its aspects. They are arranged under the following sections: technique (including chemical and experimental methods), composition of food, physiology of nutrition, human diet in relation to health and disease (including dietary studies, food economics, deficiency diseases and therapeutic dietetics), feeding of animals and book reviews. Each issue also contains a review article on some subject of general interest.

Published quarterly. Annual subscription 42s.

Technical Communications

These are published at irregular intervals, price 1s.

Imperial Bureau of Animal Breeding and Genetics

King's Buildings, University of Edinburgh

ANIMAL BREEDING ABSTRACTS

This journal contains abstracts and reviews of current publications bearing on animal breeding, genetics, production, sex physiology, reproduction and cognate subjects. Published quarterly. Subscription rate, 25s. per annum.

Occasional Communications and *Bibliographies* are also issued from time to time.

Imperial Bureau of Pastures and Forage Crops

Agricultural Buildings, Alexandra Road, Aberystwyth

This Bureau covers current literature on grassland, forage crops and plant biological research, and issues two quarterly publications:—

HERBAGE ABSTRACTS and HERBAGE REVIEWS

The latter publication contains original articles and reviews on topics which merit more detailed consideration than can be given in the former.

Subscription rates: *HERBAGE ABSTRACTS.* 25s. per annum (single parts, 7s.).
HERBAGE REVIEWS. 15s.* per annum (single parts, 4s.).

*A reduction of 5s. will be made when *HERBAGE ABSTRACTS* is also ordered.

At irregular intervals larger monographs are published on miscellaneous subjects in the form of *Bulletins.*

Printed in Great Britain by H. R. Grubb, Ltd., Croydon.